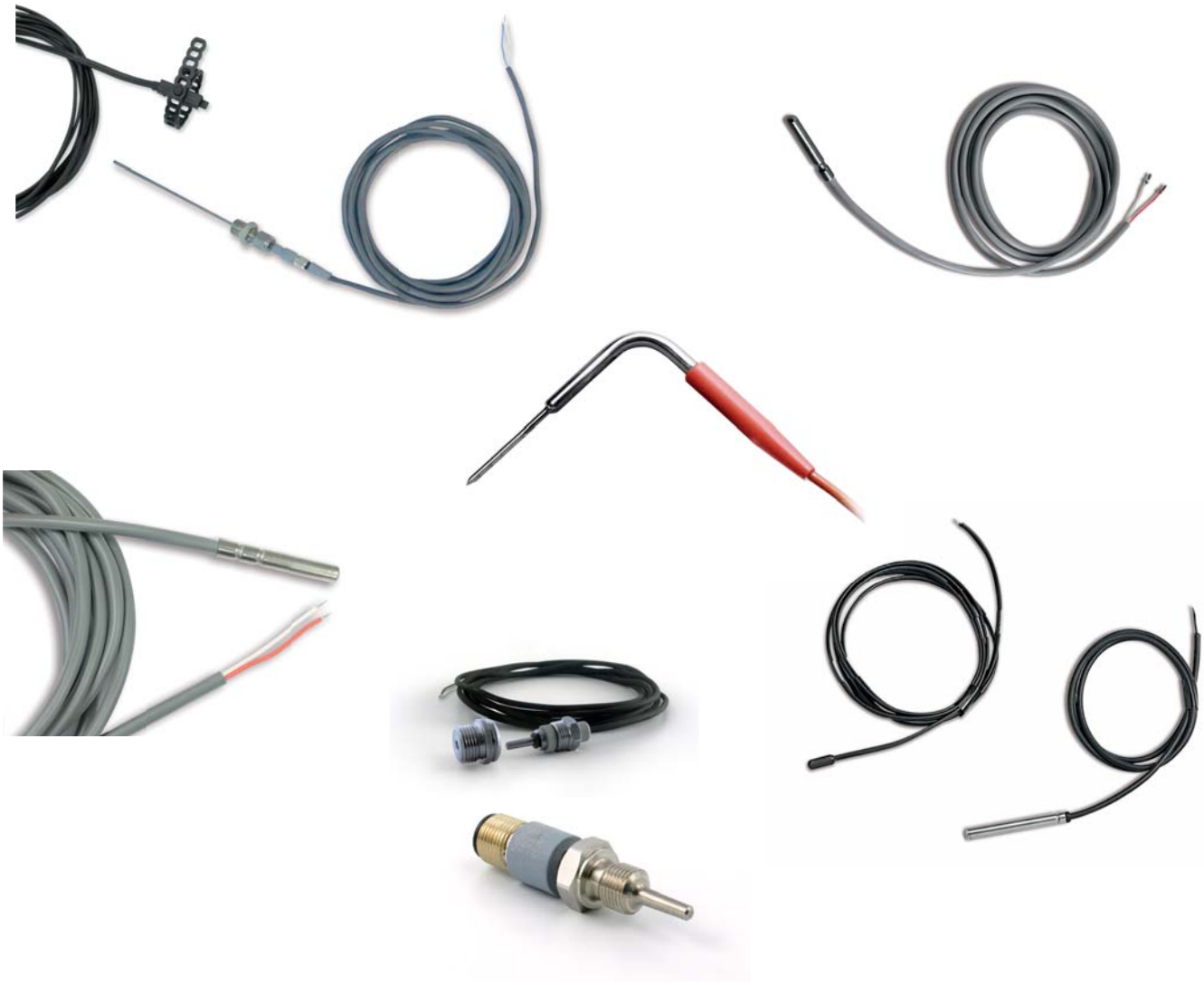
Sensori di temperatura passivi
Passive temperature probes

CAREL

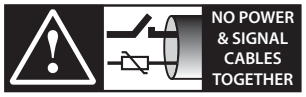


ITA Manuale d'uso

ENG User manual

LEGGI E CONSERVA QUESTE ISTRUZIONI

READ AND SAVE THESE INSTRUCTIONS



READ CAREFULLY IN THE TEXT!

Integrated Control Solutions & Energy Savings

ATTENZIONE

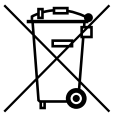
CAREL basa lo sviluppo dei suoi prodotti su una esperienza pluridecennale nel campo HVAC, sull'investimento continuo in innovazione tecnologica di prodotto, su procedure e processi di qualità rigorosi con test in-circuito e funzionali sul 100% della sua produzione, sulle più innovative tecnologie di produzione disponibili nel mercato. CAREL e le sue filiali/affiliate non garantiscono tuttavia che tutti gli aspetti del prodotto e del software incluso nel prodotto risponderanno alle esigenze dell'applicazione finale, pur essendo il prodotto costruito secondo le tecniche dello stato dell'arte. Il cliente (costruttore, progettista o installatore dell'equipaggiamento finale) si assume ogni responsabilità e rischio in relazione alla configurazione del prodotto per il raggiungimento dei risultati previsti in relazione all'installazione e/o equipaggiamento finale specifico. CAREL in questo caso, previ accordi specifici, può intervenire come consulente per la buona riuscita dello start-up macchina finale/applicazione, ma in nessun caso può essere ritenuta responsabile per il buon funzionamento del equipaggiamento/impianto finale.

Il prodotto CAREL è un prodotto avanzato, il cui funzionamento è specificato nella documentazione tecnica fornita col prodotto o scaricabile, anche anteriormente all'acquisto, dal sito internet www.carel.com.
Ogni prodotto CAREL, in relazione al suo avanzato livello tecnologico, necessita di una fase di qualifica / configurazione / programmazione / commissioning affinché possa funzionare al meglio per l'applicazione specifica. La mancanza di tale fase di studio, come indicata nel manuale, può generare malfunzionamenti nei prodotti finali di cui CAREL non potrà essere ritenuta responsabile. Soltanto personale qualificato può installare o eseguire interventi di assistenza tecnica sul prodotto.
Il cliente finale deve usare il prodotto solo nelle modalità descritte nella documentazione relativa al prodotto stesso.
Senza che ciò escluda la doverosa osservanza di ulteriori avvertenze presenti nel manuale, si evidenza che è in ogni caso necessario, per ciascun Prodotto di CAREL:

- Evitare che i circuiti elettronici si bagnino. La pioggia, l'umidità e tutti i tipi di liquidi o la condensa contengono sostanze minerali corrosive che possono danneggiare i circuiti elettronici. In ogni caso il prodotto va usato o stoccato in ambienti che rispettano i limiti di temperatura ed umidità specificati nel manuale.
- Non installare il dispositivo in ambienti particolarmente caldi. Temperature troppo elevate possono ridurre la durata dei dispositivi elettronici, danneggiarli e deformare o fondere le parti in plastica. In ogni caso il prodotto va usato o stoccato in ambienti che rispettano i limiti di temperatura ed umidità specificati nel manuale.
- Non tentare di aprire il dispositivo in modi diversi da quelli indicati nel manuale.
- Non fare cadere, battere o scuotere il dispositivo, poiché i circuiti interni e i meccanismi potrebbero subire danni irreparabili.
- Non usare prodotti chimici corrosivi, solventi o detergenti aggressivi per pulire il dispositivo.
- Non utilizzare il prodotto in ambiti applicativi diversi da quanto specificato nel manuale tecnico.

Tutti i suggerimenti sopra riportati sono validi altresì per il controllo, schede seriali, chiavi di programmazione o comunque per qualunque altro accessorio del portfolio prodotti CAREL.
CAREL adotta una politica di continuo sviluppo. Pertanto CAREL si riserva il diritto di effettuare modifiche e miglioramenti a qualsiasi prodotto descritto nel presente documento senza previo preavviso. I dati tecnici presenti nel manuale possono subire modifiche senza obbligo di preavviso.
La responsabilità di CAREL in relazione al proprio prodotto è regolata dalle condizioni generali di contratto CAREL editate nel sito www.carel.com e/o da specifici accordi con i clienti; in particolare, nella misura consentita dalla normativa applicabile, in nessun caso CAREL, i suoi dipendenti o le sue filiali/affiliate saranno responsabili di eventuali mancati guadagni o vendite, perdite di dati e di informazioni, costi di merci o servizi sostitutivi, danni a cose o persone, interruzioni di attività, o eventuali danni diretti, indiretti, incidentali, patrimoniali, di copertura, punitivi, speciali o consequenziali in qualunque modo causati, siano essi contrattuali, extra contrattuali o dovuti a negligenza o altra responsabilità derivanti dall'installazione, utilizzo o impossibilità di utilizzo del prodotto, anche se CAREL o le sue filiali/affiliate siano state avvisate della possibilità di danni.

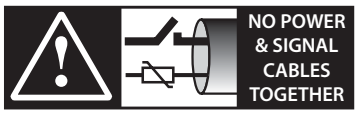
SMALTIMENTO DEL PRODOTTO



Il prodotto è composto da parti in metallo e parti in plastica.
In riferimento alla Direttiva 2002/96/CE del Parlamento Europeo e del Consiglio del 27 gennaio 2003 e alle relative normative nazionali di attuazione, Vi informiamo che:

1. sussiste l'obbligo di non smaltire i RAEE come rifiuti urbani e di effettuare, per detti rifiuti, una raccolta separata;
2. per lo smaltimento vanno utilizzati i sistemi di raccolta pubblici o privati previsti dalla leggi locali. È inoltre possibile riconsegnare al distributore l'apparecchiatura a fine vita in caso di acquisto di una nuova;
3. questa apparecchiatura può contenere sostanze pericolose: un uso improprio o uno smaltimento non corretto potrebbe avere effetti negativi sulla salute umana e sull'ambiente;
4. il simbolo (contenitore di spazzatura su ruote barrato) riportato sul prodotto o sulla confezione e sul foglio istruzioni indica che l'apparecchiatura è stata immessa sul mercato dopo il 13 agosto 2005 e che deve essere oggetto di raccolta separata;
5. in caso di smaltimento abusivo dei rifiuti elettrici ed elettronici sono previste sanzioni stabilite dalle vigenti normative locali in materia di smaltimento.

Qualora l'aparecchio venisse adoperato in modo non specificato dal costruttore, la protezione prevista dall'apparecchio potrebbe essere compromessa.



READ CAREFULLY IN THE TEXT!

ATTENZIONE: separare quanto più possibile i cavi delle sonde e degli ingressi digitali dai cavi dei carichi induttivi e di potenza per evitare possibili disturbi elettromagnetici.
Non inserire mai nelle stesse canaline (comprese quelle dei quadri elettrici) cavi di potenza e cavi di segnale.

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1. INTRODUZIONE

1.1 Descrizione generale

Le sonde di temperatura passive Carel sono dei dispositivi che collegati al controllo forniscono, il valore della resistenza, che viene convertita in temperatura dal controllo elettronico. Sono utilizzate nelle applicazioni nel mercato HVAC/R, e rappresentano una gamma completa per soddisfare le diverse esigenze nelle varie installazioni, sono realizzate con materiali che ne garantiscono una qualità costante.

La gamma include vari modelli da usare in base alle prestazioni del sistema e ai campi applicativi. Le sonde, si differenziano per il tipo di sensore (NTC, PTC, Pt1000), tipo di cappuccio, grado di protezione, lunghezza cavi, campo di lavoro, e dimensione meccanica.

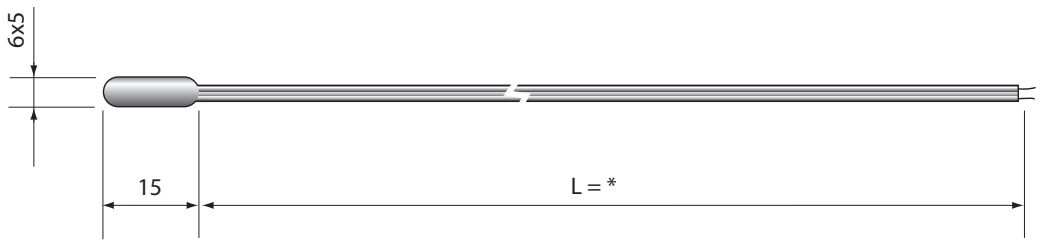
Sono inoltre disponibili modelli di sensori per uso idronico, da applicare direttamente sulla tubatura, che semplificano il fissaggio e velocizzano la risposta di lettura, migliorando il cablaggio dell'unità HVAC/R e migliorando le prestazioni.

I sensori sono utilizzati insieme ai controlli elettronici Carel (parametrici e programmabili).

2. CARATTERISTICHE TECNICHE NTC

2.1 Modelli NTC*HP*

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro /	-50T105 °C in aria
	-50T50 °C in fluido
Connessioni	Terminali spellati, dimensioni: 5±1 mm
Sensore	NTC 10 kΩ ±1% a 25 °C Beta 3435
Fattore di dissipazione (in aria)	ca. 3 mW/°C
Costante term. nel tempo (in aria)	ca. / approx. 75 s
Cavo	Bipolare tipo piattina nero, avente conduttore in rame stagnato con sez. 0,3 mm^2
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	Poliolefina
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma
Certificazioni	NSF

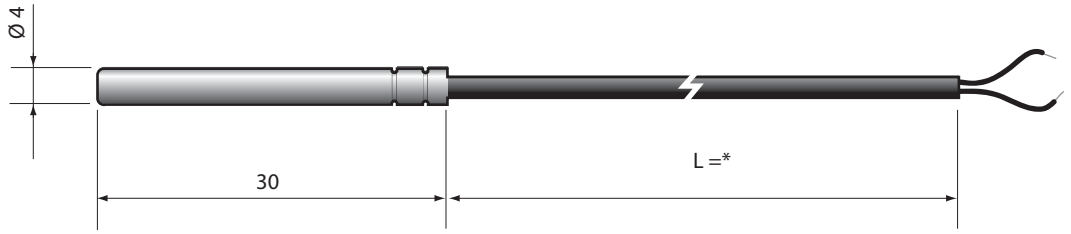


* = vedi tabella codici presente nel listino prezzi

ATTENZIONE: Tutte le misure presenti in questo manuale sono espresse in millimetri.

2.2 Modelli NTC*WF*

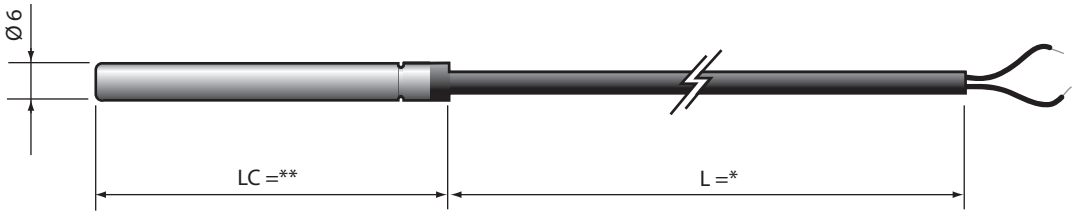
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T105 °C
Connessioni	Terminali spellati, dimensioni: 5±1 mm
Sensore	NTC 10 kΩ ±1% a 25 °C Beta 3435
Fattore di dissipazione (in aria)	ca. / approx. 7 mW/°C
Cost. term. nel tempo (in acqua)	ca. / approx. 4,5 s
Cavo	Bipolare doppia guaina di isolamento, AWG22 in rame stagnato con resistenza elettrica ≤63 Ω/km - Isolante: tipo TPE specifico ad immersione in acqua su guaina esterna, PPcop. su conduttori interni, Ø esterno 3,5 mm max.
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	acciaio AISI 316 diametro 4 mm - L= 30 mm
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac;
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma



* = vedi tabella codici presente nel listino prezzi

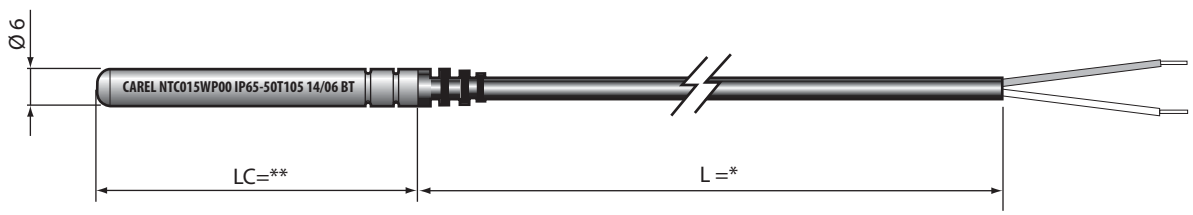
2.3 Modelli NTC*WP*

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T105 °C
Connessioni	Terminali spellati, dimensioni: 5±1 mm
Sensore	NTC 10 kΩ ±1% a 25 °C Beta 3435
Fattore di dissipazione (in aria)	ca. / approx. 2,2 mW/°C
Cost. term. nel tempo (in acqua)	ca. / approx. 20 s
Cavo	Bipolare doppia guaina di isolamento, AWG22 in rame stagnato con resistenza elettrica ≤63 Ω/km - Isolante: tipo TPE specifico ad immersione in acqua su guaina esterna, PPcop. su conduttori interni, Ø esterno 3,5 mm max
Grado di protezione elemento sensibile	IP68 Immersione in acqua 1 m di profondità per durata 200 h a 70 °C Resistenza in autoclave a vapore saturo 30 min. a 105 °C
Contenitore elemento sensibile	PPcop. con cappuccio AISI 316 esterno
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento supplementare per 250 Vac;
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma
Certificazioni	NSF



Versione 1

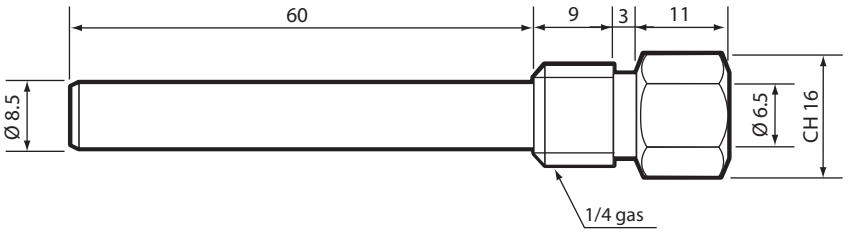
* = vedi tabella codici presente nel listino prezzi
* *= 52/100/200/300(dimensioni in mm)



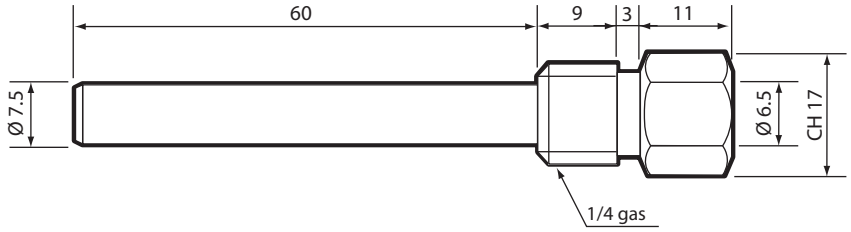
Versione 2

Accessori

Pozzetto: ottone nichelato - 1413306AXX



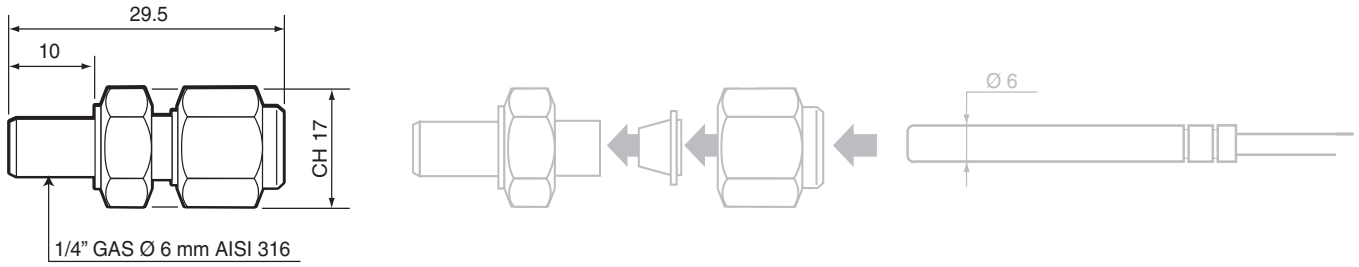
Pozzetto 2: AISI 316 - cod. 1413309AXX



Nota:

- bloccaggio cavo con passacavo PG7 - IP68 applicato sull' estremità esagonale
- è disponibile il kit completo di pozzetto e pressacavo

Raccordo a compressione con ogiva metallica - cod. 1309589AXX



2.4 Modelli NTC*WG*

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T105 °C
Connessioni	Terminali spellati, dimensioni: 5±1 mm
Sensore	NTC 10 kΩ ±1% a 25 °C Beta 3435
Fattore di dissipazione (in aria)	ca. / approx. 1 mW/°C
Cost. term. nel tempo (in acqua)	ca. / approx. 10 s
Cavo	Bipolare doppia guaina di isolamento, AWG22 in rame stagnato con resistenza elettrica ≤63 Ω/km - Isolante: tipo TPE specifico ad immersione in acqua su guaina esterna, PPcop. su conduttori interni, Ø esterno 3,5 mm max
Grado di protezione elemento sensibile	IP67 (in resina poliuretanica)
Contenitore elemento sensibile	Alluminio 6x6x40
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac;
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma

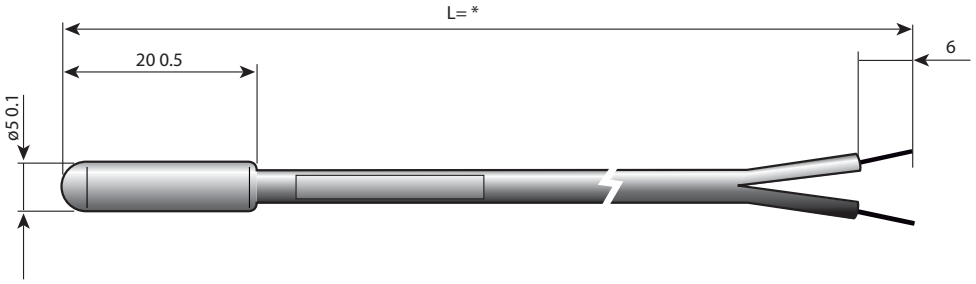
Cappuccio per sensore sonda

* = vedi tabella codici presente nel listino prezzi

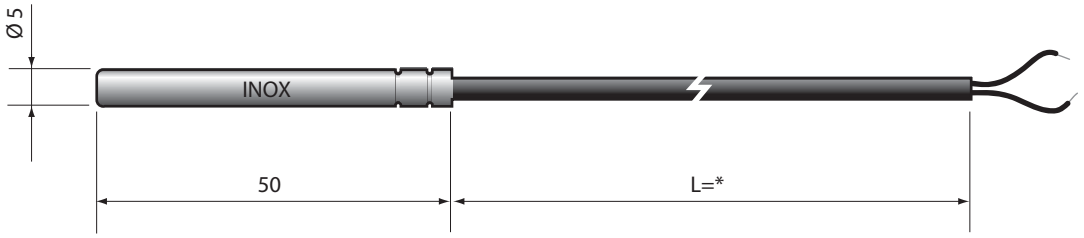
2.5 Modelli NTC*HT*

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	150 °C in aria
Connessioni	Terminali spellati dimensioni 6±1mm
Sensore	R(25 °C)= 50 kOhm 1%; Beta (25/85)3977±1%
Precisione	+/- 0,5 °C; -10T50 °C +/- 1,0 °C; -50T85 °C +/- 1,6 °C; +85T120 °C +/- 2,1 °C; +120T150 °C
Fattore di dissipazione (in aria)	ca. / approx. 3 mW
Costante term. nel tempo (in aria)	ca. / approx. 60 s
Cavo	Poliestere per alta temperatura (diam. 4x2 max.)
Grado di protezione elemento sensibile	IP55
Contenitore elemento sensibile	Poliestere per alta temperatura dim. 20x5 mm (disponibile in versione con cappuccio INOX AISI 316)
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac
Categoria di resistenza al calore e al fuoco	In accordo con CEI 20-35
Res. isolamento a 1000 Vdc	>100 MOhm
Rigidità dielettrica	1500 Vac

Nota: le sonde NTC*HT non possono essere usate in presenza prolungata di acqua e non devono essere usate a temperature inferiori a 0 °.



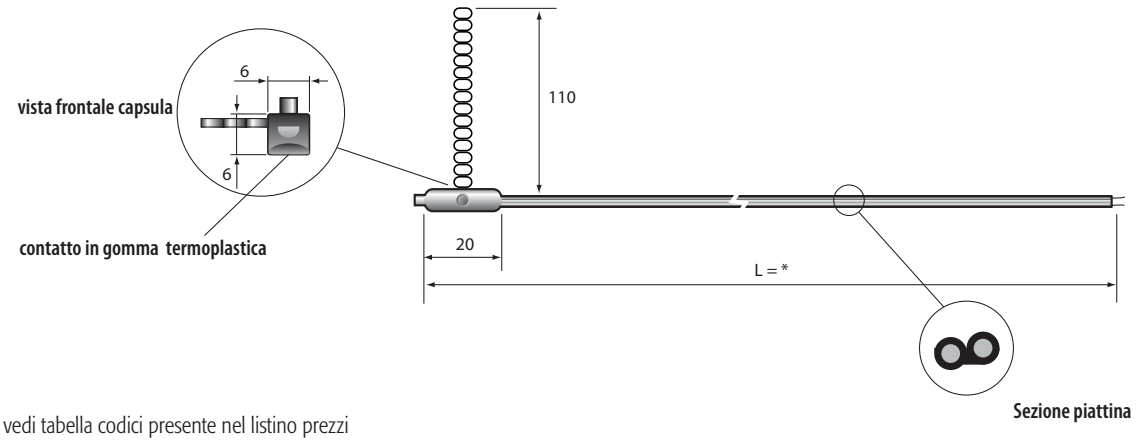
Versione con cappucio INOX



* = vedi tabella codici presente nel listino prezzi

2.6 Modelli NTC*HF*

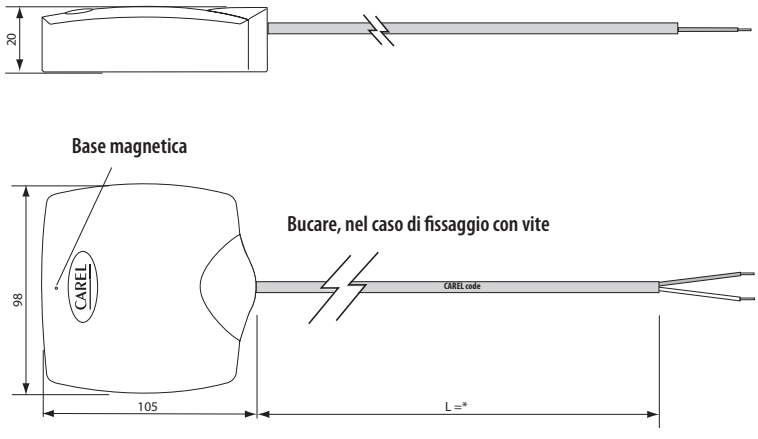
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T90 °C
Connessioni	Terminali spellati dimensioni 6±1mm
Sensore	R(25 °C)= 10 kOhm 1%; Beta 3435
Precisione	+/- 0,5 °C a 25 °C; +/- 1,0 °C da -50T90 °C
Fattore di dissipazione (in aria)	3 mW
Costante term. nel tempo (in acqua)	ca. 15 s
Cavo	Piattina in gomma termoplastica nera (diam. 3,6x1,6 max.)
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	Termoplastico con fascetta di fissaggio
Classificazione secondo la protezione contro	Isolamento principale per 250 Vac
Categoria di resistenza al calore e al fuoco	Cavo UL/HB
Res. isolamento a 500 Vdc	>20 mOhm
Rigidità dielettrica	1500 Vac



* = vedi tabella codici presente nel listino prezzi

2.7 Modelli NTC*PS*

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T105 °C
Connessioni	Terminali spellati e stagnati dimensioni: 4±1 mm
Sensori	NTC 10 kΩ ±1% a 25 °C Beta 3435
Fattore di dissipazione (in aria)	2 mW/°C
Cost. term. nel tempo (in aria)	ca. / approx. 50 min (V=1 m/s)
Cavo	Bipolare doppia guaina di isolamento, AWG22 in rame stagnato con resistenza elettrica ≤73.9 Ω/km - Isolante: tipo TPE specifico ad immersione in acqua su guaina esterna, PPcop. Su conduttori interni, Ø esterno 3.30+/-0.10 mm
Grado di protezione elemento sensibile	IP67
Contenitore	Santoprene Grigio RAL7032
	Compatibile per uso alimentare
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac;
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma



* = vedi tabella codici presente nel listino prezzi

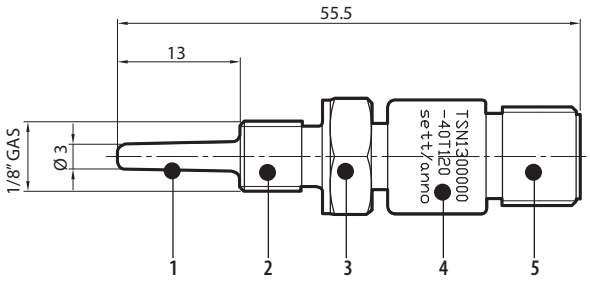
3. CARATTERISTICHE TECNICHE SONDE IMMERSIONE NTC

3.1 Modello TSN1300000

Le sonde ad immersione hanno il sensore direttamente a contatto con il liquido e viene installato sulla tubatura. il collegamento elettrico avviene tramite connettore.

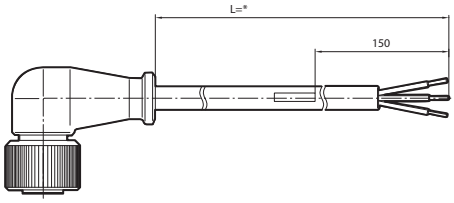
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-40T120 °C
Sensore	NTC 10 kΩ ±1% a 25 °C Beta 3435
Costruzione	Ad immersione diretta monolitica con attacco al processo 1/8' GAS UNI 338 maschio
Connessione elettrica	Nylon costampato 4 vie M12x1 (DIN-VDE0627) filettatura met. IP67 Temp. Max 90 °C
Cost. term. nel tempo (in acqua)	ca. / approx. 5 s
Contenitore elemento sensibile	AISI 316
Isolamento	100 Mohm a 500 Vcc
Pressione massima di lavoro	40 bar

1	Elemento sensibile NTC 10 Kohn
2	Pozzetto INOX
3	EX14
4	Corpo costampato
5	Connettore M12 maschio

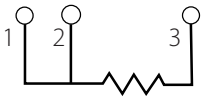


Accessori:

- Connettore 4 poli tipo M12 per sensore 1/8 GAs - lunghezza cavo 3 m
  Cod. TSOPZCW030



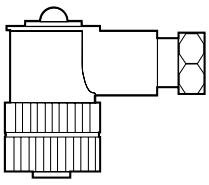
Collegamento elettrici:

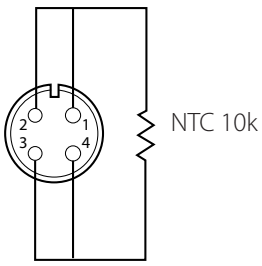


NTC 10kohm

1	rosso
2	rosso
3	bianco

- Connettore 4 poli tipo M12 per sensore 1/8 GAS
  Cod. TSOPZCM000
  Connettore M12 assemblabile in opera, cavo consigliato 3x0.2 mmq con guaina esterna.

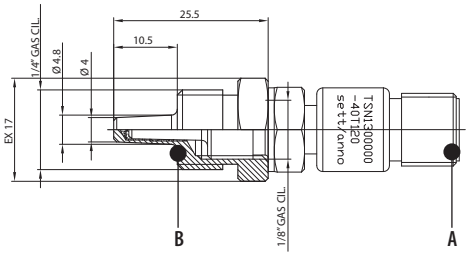




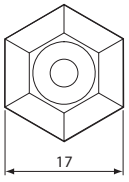
Vista sensore lato connettore

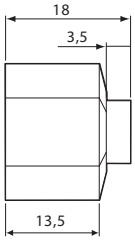
- Pozzetto 1/4 Gas
  Cod. TSOPZPT000

A	Attacco 1/8" GAS CIL. per sensore
B	Attacco a processo 1/4" GAS CIL. con immersione L= 10,5 mm



- Raccordo a saldare
  Cod. TSOPZRT000

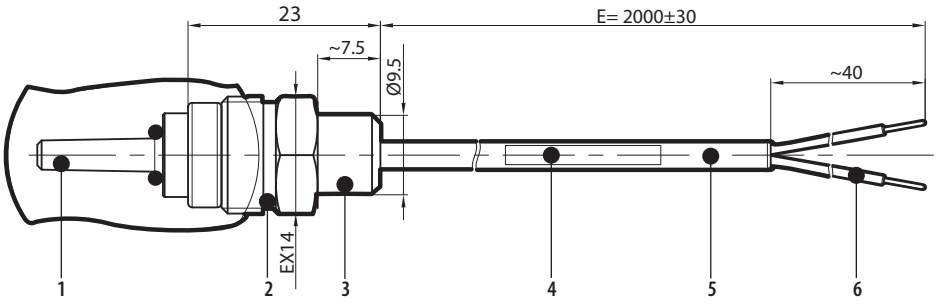




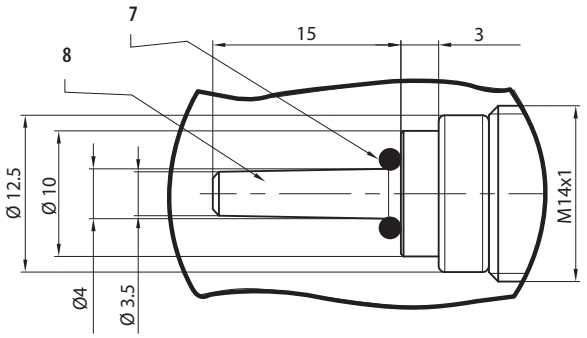
3.2 Modello TSC1500030

La sonde ad immersione hanno il sensore direttamente a contatto con il liquido. Il fissaggio alla tubatura avviene tramite raccordo, disponibile nelle versioni a vite o a saldare.
Il corpo è in ottone nichelato con grado di protezione IP67 e la guarnizione di tenuta (o-ring) viene fornita insieme al sensore.

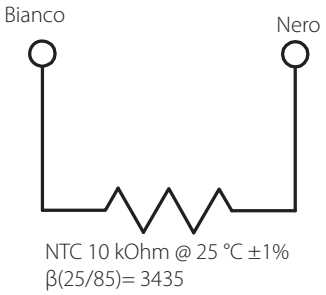
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-40T90 °C
Sensore	NTC 10 kΩ ±1% a 25 °C Beta 3435
Costruzione	Ad immersione diretta monolitica con attacco al processo M14 maschio
Cavo	2 conduttori AWG 22, con guaina in TPE
Cost. term. nel tempo (in acqua)	ca. / approx. 5 s
Contenitore elemento sensibile	Ottone nichelato e corpo costampato PA6 grigio
Isolamento	100 Mohm a 100 Vcc
Pressione massima di lavoro	25 bar
Liquidi compatibili	Acqua, Olio



1	elemento sensibile
2	ghiera di fissaggio in ottone nichelato
3	corpo costampato
4	marcatura cavo
5	cavo in rame stagnato a 2 cond
6	sensore NTC
7	oring 2015
8	pozzetto termometrico in ottone nichelato



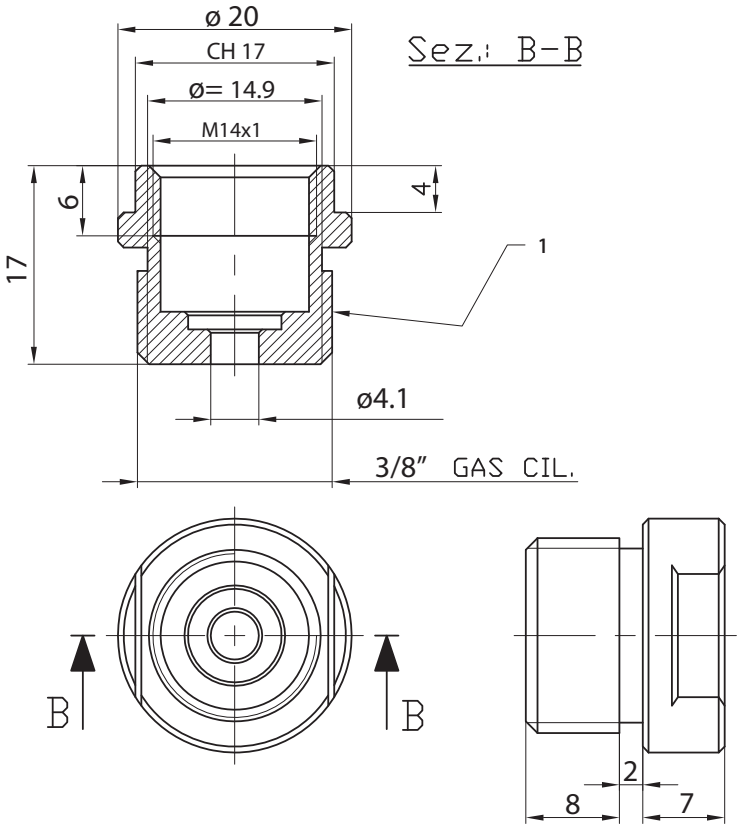
Collegamento elettrico

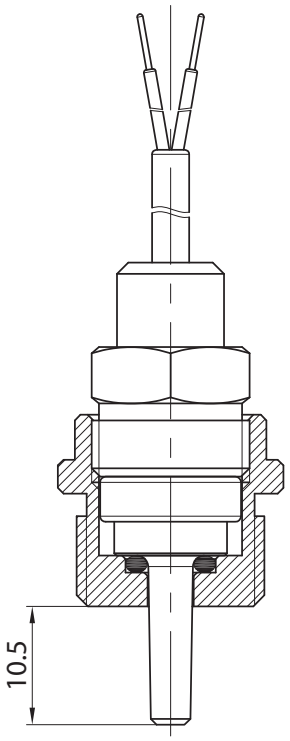


NTC 10 kOhm @ 25 °C ±1%
β(25/85)= 3435

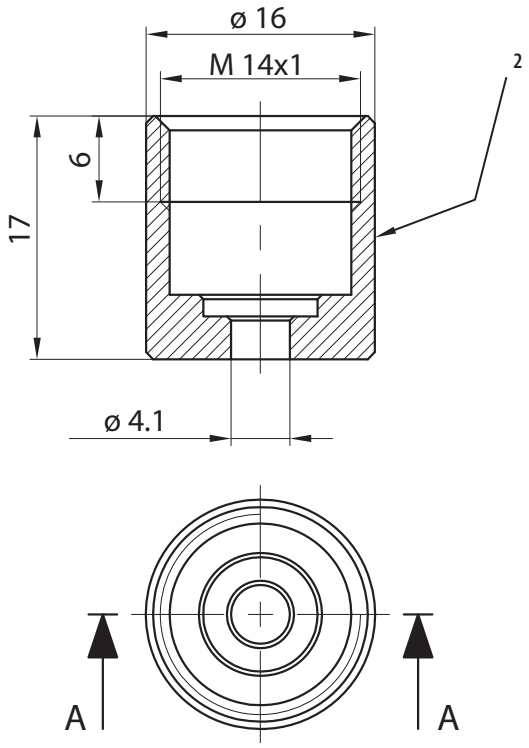
ACCESSORI:

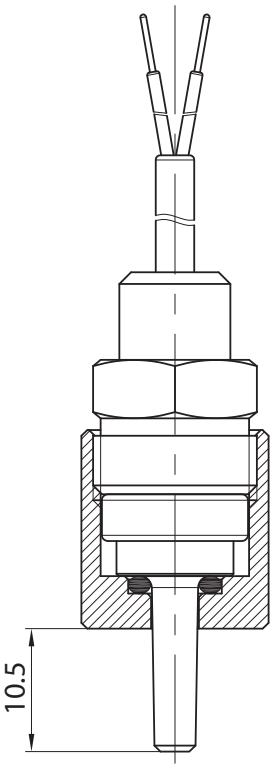
Raccordo adattatore da M14 a 3/8 GAS
Cod.TSOPZRV000





Raccordo adattatore a saldare per M14
Cod.TSOPZRS000





1	attacco filettato 3/8 Cil. con sede tonda Mat. Ottone Nichelato	cod: C058042A04
2	attacco cilindrico a brasare con sede tonda Mat. Ottone	cod. C058042A03

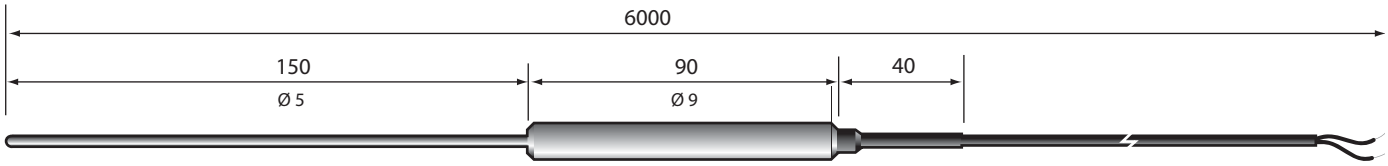
4. CARATTERISTICHE TECNICHE SONDE NTC INFILZAGGIO

4.1 Modelli NTC*INF*

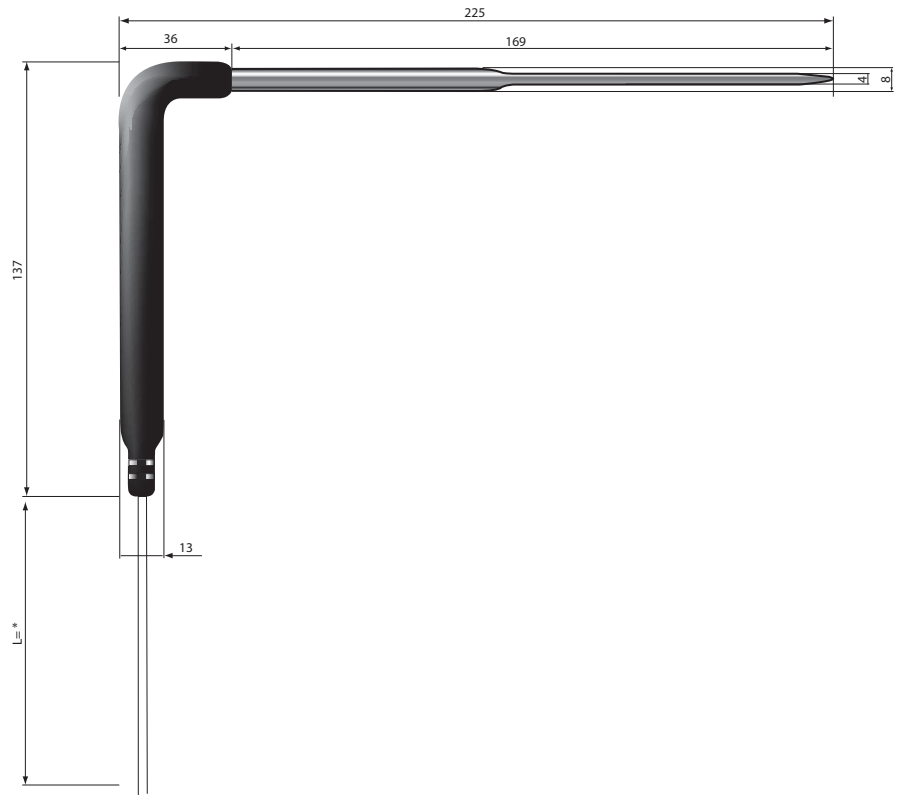
Sonde per infilzaggio con impugnatura 90° e 180°

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T90 °C
Connessioni	Terminali spellati, dimensioni: 5±1 mm
Sensore	NTC 10 kOhm ±1% a 25 °C Beta 3435
Fattore di dissipazione (in aria)	ca. 2,2 mW/°C
Costante term. nel tempo (in aria)	ca. / approx.10 s
Cavo	Bipolare doppia guaina di isolamento, in rame stagnato sez. conduttore 0,35 mm^2 con resistenza elettrica ≤63 Ohm/km
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	Acciaio INOX AISI 304 con riempitivo in resina siliconica
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolante: tipo siliconico sia su guaina esterna, sia su conduttori interni
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma

NTCINF600*



NTCINF610*

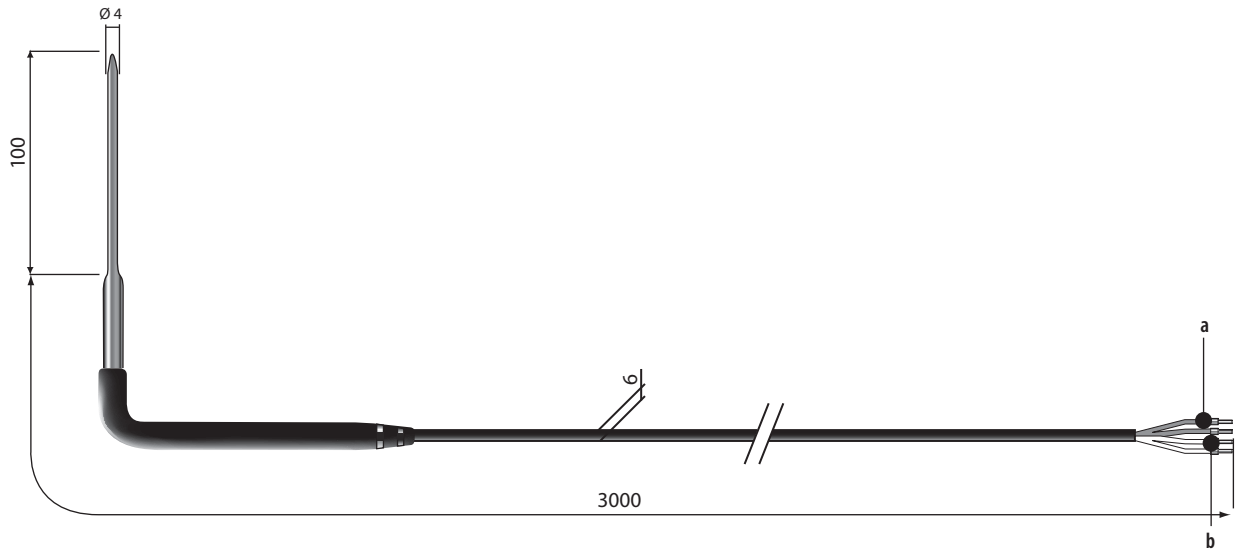


* = vedi tabella codici presente nel listino prezzi

4.2 Modello NTCINF0340

Sonda per infilzaggio con impugnatura 90° con sistema riscaldante

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T90 °C
Connessioni	Terminali spellati, con puntalini
Sensore	NTC 10 kOhm ±1% a 25 °C Beta 3435
Costante term. nel tempo (in acqua)	ca. / approx. 10 s
Cavo	Guaina termoplastica per uso alimentare con 4 fili sez. conduttore 0,15 mm^2
Colori cavo	Bianco-Nero, resistenza NTC / Rossi, resistenza elettrica.
Tensione massima della resistenza elettrica	24 Vac
Valore resistenza elettrica di riscaldamento	7 Ohm ±0,6
Lunghezza cavo	3 m
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	Acciaio INOX AISI 316. Lunghezza 100 mm diam. 4 mm. Con punta accumuninata.
Riempitivo del cappuccio	Aluminia
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolante: Guaina esterna, sia su conduttori interni
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma
Resistenza di isolamento	20 Mohm 500 Vcc
Rigidità	500 Vac



a	rossi, resistenza elettrica
b	bianco/bianco, resistenza NTC

5. TABELLA VALORI TEMPERATURA

5.1 Tabella valori temperatura resistenza sensore NTC 10K@25°C ß 3435

Temp.	Valore di Resistenza		
	Max.	Tipico	Min.
°C	KΩ	KΩ	KΩ
-50	344,60	329,50	314,90
-49	325,00	310,90	297,30
-48	306,60	293,50	280,90
-47	289,40	277,20	265,40
-46	273,40	262,00	251,00
-45	258,30	247,70	237,40
-44	244,20	234,30	224,70
-43	231,00	221,70	212,80
-42	218,60	209,90	201,60
-41	207,00	198,90	191,00
-40	196,00	188,50	181,10
-39	185,50	178,50	171,60
-38	175,60	169,00	162,60
-37	166,30	160,20	154,20
-36	157,60	151,90	146,30
-35	149,40	144,10	138,80
-34	141,70	136,70	131,80
-33	134,50	129,80	125,20
-32	127,70	123,30	119,00
-31	121,20	117,10	113,10
-30	115,20	111,30	107,50
-29	109,40	105,70	102,20
-28	103,90	100,50	97,20
-27	98,68	95,52	92,45
-26	93,80	90,84	87,97
-25	89,20	86,43	83,73
-24	84,85	82,26	79,74
-23	80,76	78,33	75,96
-22	76,89	74,61	72,39
-21	73,23	71,10	69,01
-20	69,77	67,77	65,82
-19	66,44	64,57	62,74
-18	63,30	61,54	59,83
-17	60,32	58,68	57,07
-16	57,51	55,97	54,46
-15	54,85	53,41	51,99
-14	52,33	50,98	49,65
-13	49,95	48,68	47,43
-12	47,69	46,50	45,32
-11	45,55	44,43	43,33
-10	43,52	42,47	41,43
-9	41,55	40,57	39,60
-8	39,69	38,77	37,86
-7	37,92	37,06	36,21
-6	36,25	35,44	34,64
-5	34,66	33,90	33,15
-4	33,15	32,44	31,73
-3	31,72	31,05	30,39
-2	30,36	29,73	29,11
-1	29,06	28,48	27,89
0	27,83	27,28	26,74

Temp.	Valore di Resistenza		
	Max.	Tipico	Min.
°C	KΩ	KΩ	KΩ
1	26,65	26,13	25,62
2	25,52	25,03	24,55
3	24,44	23,99	23,54
4	23,42	23,00	22,57
5	22,45	22,05	21,66
6	21,53	21,15	20,78
7	20,64	20,30	19,95
8	19,81	19,48	19,15
9	19,01	18,70	18,39
10	18,25	17,96	17,67
11	17,51	17,24	16,97
12	16,81	16,56	16,30
13	16,14	15,90	15,67
14	15,50	15,28	15,06
15	14,89	14,69	14,48
16	14,31	14,12	13,92
17	13,75	13,58	13,39
18	13,22	13,06	12,89
19	12,72	12,56	12,40
20	12,24	12,09	11,94
21	11,77	11,63	11,50
22	11,32	11,20	11,07
23	10,90	10,78	10,66
24	10,49	10,38	10,27
25	10,10	10,00	9,90
26	9,73	9,63	9,53
27	9,38	9,28	9,18
28	9,04	8,94	8,84
29	8,72	8,62	8,52
30	8,41	8,31	8,21
31	8,11	8,01	7,92
32	7,83	7,73	7,63
33	7,55	7,45	7,36
34	7,29	7,19	7,10
35	7,04	6,94	6,85
36	6,79	6,70	6,61
37	6,56	6,47	6,37
38	6,34	6,25	6,15
39	6,12	6,03	5,94
40	5,92	5,83	5,74
41	5,72	5,63	5,54
42	5,53	5,44	5,35
43	5,34	5,26	5,17
44	5,17	5,08	4,99
45	5,00	4,91	4,83
46	4,83	4,75	4,67
47	4,68	4,59	4,51
48	4,52	4,44	4,36
49	4,38	4,30	4,22
50	4,24	4,16	4,08
51	4,10	4,03	3,95
52	3,97	3,90	3,82
53	3,85	3,77	3,70
54	3,73	3,65	3,58
55	3,61	3,54	3,46

Temp.	Valore di Resistenza		
	Max.	Tipico	Min.
°C	KΩ	KΩ	KΩ
56	3,50	3,43	3,35
57	3,39	3,32	3,25
58	3,28	3,22	3,15
59	3,18	3,12	3,05
60	3,09	3,02	2,95
61	2,99	2,93	2,86
62	2,90	2,84	2,77
63	2,82	2,75	2,69
64	2,73	2,67	2,61
65	2,65	2,59	2,53
66	2,57	2,51	2,45
67	2,50	2,44	2,38
68	2,42	2,36	2,31
69	2,35	2,30	2,24
70	2,28	2,23	2,17
71	2,22	2,16	2,11
72	2,15	2,10	2,05
73	2,09	2,04	1,99
74	2,03	1,98	1,93
75	1,98	1,92	1,87
76	1,92	1,87	1,82
77	1,87	1,82	1,77
78	1,81	1,77	1,72
79	1,76	1,72	1,67
80	1,72	1,67	1,62
81	1,67	1,62	1,58
82	1,62	1,58	1,53
83	1,58	1,53	1,49
84	1,54	1,49	1,45
85	1,49	1,45	1,41
86	1,45	1,41	1,37
87	1,42	1,37	1,33
88	1,38	1,34	1,30
89	1,34	1,30	1,26
90	1,31	1,27	1,23
91	1,27	1,23	1,19
92	1,24	1,20	1,16
93	1,21	1,17	1,13
94	1,17	1,14	1,10
95	1,14	1,11	1,07
96	1,12	1,08	1,04
97	1,09	1,05	1,02
98	1,06	1,02	0,99
99	1,03	1,00	0,97
100	1,01	0,97	0,94
101	0,98	0,95	0,92
102	0,96	0,92	0,89
103	0,93	0,90	0,87
104	0,91	0,88	0,85
105	0,89	0,86	0,83
106	0,87	0,84	0,81
107	0,84	0,82	0,79
108	0,82	0,80	0,77
109	0,80	0,78	0,75
110	0,79	0,76	0,73

5.2 Tabella valori temperatura resistenza sensore NTC 50K@25°C ß 3977

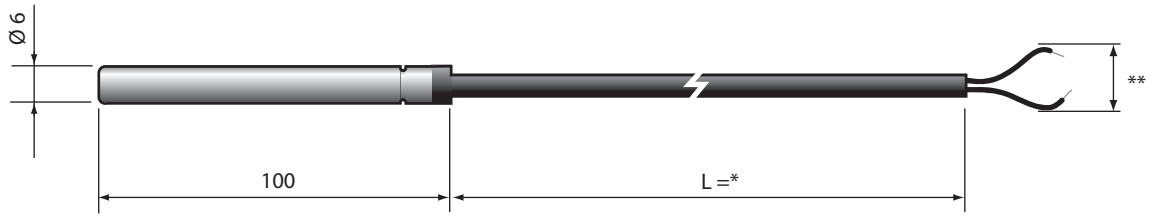
Temperatura	Valore di Resistenza tipico	TCR	Valore di Resistenza Min.	Valore di Resistenza Max.	% Tolleranza		°C Tolleranza	
°C	KΩ	%/°C	KΩ	KΩ	Min.	Max.	Min.	Max.
-40	1630,77	-6,623	1559,17	1705,49	-4,39	4,58	0,66	-0,69
-35	1178,11	-6,385	1130,05	1228,08	-4,08	4,24	0,64	-0,66
-30	860,97	-6,161	828,44	894,68	-3,78	3,92	0,61	-0,64
-25	636,08	-5,950	613,91	658,99	-3,49	3,60	0,59	-0,61
-20	474,78	-5,751	459,57	490,44	-3,20	3,30	0,56	-0,57
-15	357,83	-5,562	347,35	368,59	-2,93	3,01	0,53	-0,54
-10	272,18	-5,384	264,93	279,59	-2,66	2,73	0,49	-0,51
-5	208,83	-5,214	203,81	213,96	-2,41	2,45	0,46	-0,47
0	161,56	-5,053	158,08	165,10	-2,15	2,19	0,43	-0,43
5	125,97	-4,900	123,56	128,41	-1,91	1,94	0,39	-0,40
10	98,96	-4,755	97,30	100,63	-1,67	1,69	0,35	-0,36
15	78,29	-4,616	77,16	79,43	-1,44	1,45	0,31	-0,31
20	62,37	-4,483	61,61	63,13	-1,22	1,22	0,27	-0,27
25	50,00	-4,357	49,50	50,50	-1,00	1,00	0,23	-0,23
30	40,34	-4,236	39,85	40,83	-1,21	1,22	0,29	-0,29
35	32,73	-4,120	32,27	33,20	-1,42	1,43	0,34	-0,35
40	26,71	-4,009	26,28	27,15	-1,62	1,64	0,40	-0,41
45	21,92	-3,903	21,52	22,32	-1,81	1,84	0,46	-0,47
50	18,08	-3,801	17,72	18,45	-2,00	2,03	0,53	-0,53
55	14,99	-3,704	14,66	15,32	-2,19	2,22	0,59	-0,60
60	12,48	-3,610	12,19	12,78	-2,36	2,41	0,65	-0,67
65	10,44	-3,519	10,18	10,72	-2,54	2,59	0,72	-0,74
70	8,78	-3,433	8,54	9,02	-2,71	2,77	0,79	-0,81
75	7,41	-3,349	7,20	7,63	-2,87	2,95	0,86	-0,88
80	6,28	-3,269	6,09	6,48	-3,03	3,12	0,93	-0,95
85	5,34	-3,191	5,17	5,52	-3,19	3,28	1,00	-1,03
90	4,56	-3,117	4,41	4,72	-3,34	3,45	1,07	-1,11
95	3,91	-3,045	3,78	4,05	-3,49	3,61	1,15	-1,18
100	3,37	-2,975	3,24	3,49	-3,64	3,76	1,22	-1,26
105	2,91	-2,908	2,80	3,02	-3,78	3,92	1,30	-1,35
110	2,52	-2,843	2,42	2,62	-3,92	4,06	1,38	-1,43
115	2,19	-2,781	2,10	2,28	-4,05	4,21	1,46	-1,51
120	1,91	-2,720	1,83	1,99	-4,18	4,35	1,54	-1,60
125	1,67	-2,662	1,59	1,74	-4,31	4,50	1,62	-1,69
130	1,46	-2,605	1,40	1,53	-4,44	4,63	1,70	-1,78
135	1,28	-2,551	1,22	1,34	-4,56	4,77	1,79	-1,87
140	1,13	-2,498	1,08	1,19	-4,68	4,90	1,87	-1,96
145	1,00	-2,446	0,95	1,05	-4,80	5,03	1,96	-2,06
150	0,89	-2,396	0,84	0,93	-4,91	5,16	2,05	-2,15

6. CARATTERISTICHE TECNICHE SONDE PT100

6.1 Modelli PT100

Sonda con fissaggio a fascetta

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro elemento sensibile	PT100000A1: -50 °C…+250 °C PT100000A2 : -50 °C…+400 °C
Sensore	Pt100 Classe B secondo normative DIN IEC751 a 3 fili
Precisione	+/- classe B=(0,005xt)+0,3, a 100°C = ±0,8°C
Connessioni aliment. e uscita	Terminali spelati dimensioni 6±1mm
Cavo	PT100000A1: Gomma siliconica ALOGEN COMPOUNDS ≤ 1.1 x 10-3 mg/g PT100000A2: 3x0,5 mm² Isolamento conduttori e secondario in fibra di vetro
Fattore di dissipazione (in aria)	0,3 K/mW at 0 °C
Costante termica nel tempo (in aria)	R0-drift 0,004% dopo 1000 h a 500 °C
Categoria di resistenza al calore-fuoco	Range -20 °C +200°C per PT100000A1, +500 °C per PT100000A2
Resistenza di isolamento	>500 Mohm / 250 V
Rigidità dielettrica	250 Vac (solo per il cod. PT100000A1) non applicabile per PT100000A2
Isolamento principale (sonda e cavo)	250 Vac
Grado di protezione elemento sensibile	IP65
Contenitore elemento sensibile	Acciaio inox AISI 316



* = vedi tabella codici presente nel listino prezz
** = il sensore può essere a 2 o 3 fili

7. TABELLA VALORI SONDE PT100

7.1 Tabella valori temperatura resistenza sensore PT100 Classe B

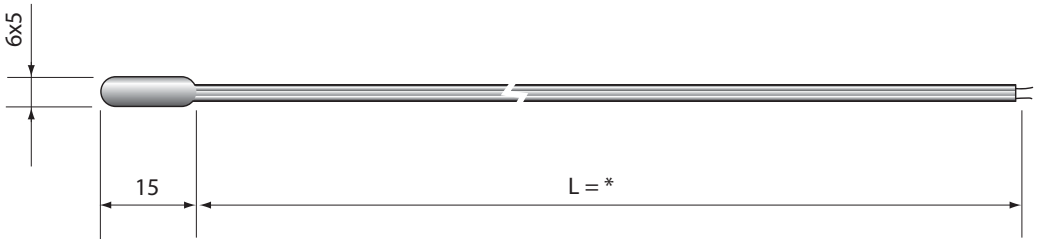
R (0) = 100,00 Ω α = 0,003 850 1/°C

°C	0	1	2	3	4	5	6	7	8	9	10	°C
- 200	IB,49											- 200
-190	22,80	22,37	21,94	21,51	21,08	20,65	20,22	19,79	19,36	18,93	18,49	-190
- I80	27,08	26,65	26,23	25,80	25,37	24,94	24,52	24,09	23,66	23,23	22,80	- I80
- 170	31,32	30,90	30,47	30,05	29,63	29,20	28,78	28,35	27,93	27,50	27,08	- 170
-160	35,53	35,11	34,69	34,27	33,85	33,43	33,01	32,59	32,16	31,74	31,32	-160
-150	39,71	39,30	38,88	38,46	38,04	37,63	37,21	36,79	36,37	35,95	35,53	-150
-140	43,87	43,45	43,04	42,63	42,21	41,79	41,38	40,96	40,55	40,13	39,71	-140
-130	48,00	47,59	47,18	46,76	46,35	45,94	45,52	45,11	44,70	44,28	43,87	-130
-120	52,11	51,70	51,29	50,88	50,47	50,06	49,64	49,23	48,82	48,41	48,00	-120
-110	56,19	55,78	55,38	54,97	54,56	54,15	53,74	53,33	52,92	52,52	52,11	-110
-100	60,25	59,85	59,44	59,04	58,63	58,22	57,82	57,41	57,00	56,60	56,19	-100
-90	64,30	63,90	63,49	63,09	62,68	62,28	61,87	61,47	61,06	60,66	60,25	-90
-80	68,33	37,92	67,52	67,12	66,72	66,31	65,91	65,51	65,11	64,70	64,30	-80
-70	72,33	71,93	71,53	71,13	70,73	70,33	69,93	69,53	69,13	68,73	68,33	-70
-60	76,33	75,93	75,53	75,13	74,73	74,33	73,93	73,53	73,13	72,73	72,33	-60
-50	80,31	79,91	79,51	79,11	78,72	78,32	77,92	77,52	77,13	76,73	76,33	-50
-40	84,27	83,88	83,48	83,08	82,69	82,29	81,89	51,50	81,10	80,70	80,31	-40
-30	88,22	87,83	87,43	87,04	86,64	86,25	85,85	85,46	85,06	84,67	84,27	-30
-20	92,16	91,77	91,37	90,98	90,59	90,19	89,80	89,40	89,01	88,62	88,22	-20
-10	96,09	95,69	95,30	94,91	94,52	94,12	93,73	93,34	92,95	92,55	92,16	-10
0	100,00	99,61	99,22	98,83	98,44	98,04	97,65	97,26	96,87	96,48	96,09	0
0	100,00	100,390	100,78	101,17	101,56	101,95	102,34	102,73	103,12	103,51	103,90	0
10	103,90	104,29	104,68	105,07	105,46	105,85	106,24	106,63	107,02	107,40	107,79	10
20	107,79	108,18	108,57	108,96	109,35	109,73	110,12	110,51	110,90	111,28	111,67	20
30	111,67	112,06	112,45	112,83	113,22	113,61	113,99	114,38	114,77	115,15	115,54	30
40	115,54	115,93	116,31	116,70	117,08	117,47	117,85	118,24	118,62	119,01	119,40	40
50	119,40	119,78	120,16	120,55	120,93	121,32	121,70	122,09	122,47	122,86	123,24	50
60	123,24	123,62	124,01	124,39	124,77	125,16	125,54	125,92	123,31	126,69	127,07	60
70	127,07	127,45	127,84	128,22	128,60	128,98	129,37	129,75	130,13	130,51	130,89	70
80	130,89	131,27	131,66	132,04	132,42	132,80	133,18	133,56	133,94	134,32	134,70	80
90	134,70	135,08	135,46	135,84	136,22	136,60	136,98	137,36	137,74	138,12	138,50	90
100	138,50	138,88	139,26	139,64	140,02	140,39	140,77	141,15	141,53	141,91	142,29	100
110	142,29	142,66	143,04	143,42	143,80	144,17	144,55	144,93	145,31	145,68	146,06	110
120	146,06	146,44	146,81	147,19	147,57	147,94	148,32	148,70	149,07	149,45	149,82	120
130	149,82	150,20	150,57	150,95	151,33	151,70	152,08	152,45	152,83	153,20	153,58	130
140	153,58	153,95	154,32	154,70	155,07	155,45	155,82	156,19	156,57	156,94	157,31	140
150	157,31	157,69	158,06	158,43	158,81	159,18	159,55	159,93	160,30	160,67	161,04	150
160	161,04	161,42	161,79	162,16	162,53	162,90	163,27	163,65	164,02	164,39	164,76	160
170	164,76	165,13	165,50	165,87	166,24	166,61	166,98	167,35	167,72	168,09	168,46	170
180	168,46	168,83	169,20	169,57	169,94	170,31	170,68	171,05	171,42	171,79	172,16	180
190	172,16	172,53	172,90	173,26	173,63	174,00	174,37	174,74	175,10	175,47	175,84	190
200	175,84	176,21	176,57	176,94	177,31	177,68	178,04	178,41	178,78	179,14	179,51	200
210	179,51	179,88	180,24	180,61	180,97	181,34	181,71	182,07	182,44	182,80	183,17	210
220	183,17	183,53	183,90	184,26	184,63	184,99	185,36	185,72	186,09	186,45	186,82	220
230	186,82	187,18	187,54	187,91	188,27	188,63	189,00	189,36	189,72	190,09	190,45	230
240	190,45	190,81	191,18	191,54	191,90	192,26	192,63	192,99	193,35	193,71	194,07	240
250	194,07	194,44	194,80	195,16	195,52	195,88	196,24	196,60	196,96	197,33	197,69	250
260	197,69	198,05	198,41	198,77	199,13	199,49	199,85	200,21	200,57	200,93	201,29	260
270	201,29	201,65	202,01	202,36	202,72	203,08	203,44	203,80	204,16	204,52	204,88	270
280	204,88	205,23	205,59	205,95	206,31	206,67	207,02	207,38	207,74	208,10	208,45	280
290	208,45	208,81	209,17	209,52	209,88	210,24	210,59	210,95	211,31	211,66	212,02	290
300	212,02	212,37	212,73	213,09	213,44	213,80	214,15	214,51	214,86	215,22	215,57	300
310	215,57	215,93	216,28	216,64	216,99	217,35	217,70	218,05	218,41	218,76	219,12	310
320	219,12	219,47	219,82	220,18	220,53	220,88	221,24	221,59	221,94	222,29	222,65	320

8. CARATTERISTICHE TECNICHE SONDE PT1000

8.1 Modelli PT1*HP*

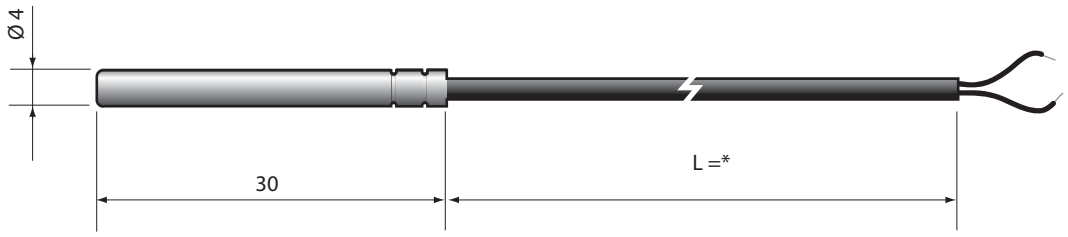
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro /	-50T105 °C in aria
	-50T50 °C in fluido
Connessioni	Terminali spellati, dimensioni: 5±1 mm
Sensore	Pt1000 - Classe B
Fattore di dissipazione (in aria)	ca. 3 mW/°C
Costante term. nel tempo (in aria)	ca. / approx. 75 s
Cavo	Bipolare tipo piattina nero, avente conduttore in rame stagnato con sez. 0,3 mm^2
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	Poliolefina
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma



* = vedi tabella codici presente nel listino prezzi

8.2 Modelli PT1*WF*

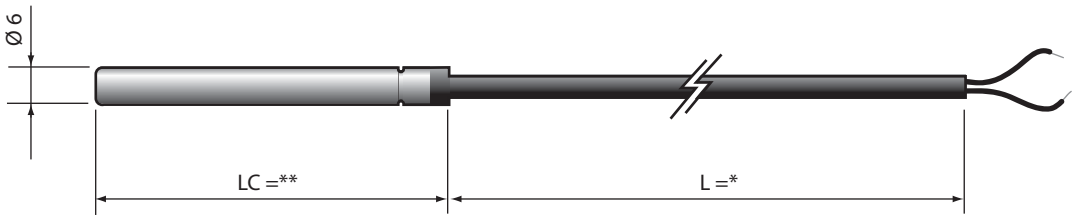
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T105 °C
Connessioni	Terminali spellati, dimensioni: 5±1 mm
Sensore	Pt1000 - Classe B
Fattore di dissipazione (in aria)	ca. / approx. 7 mW/°C
Cost. term. nel tempo (in acqua)	ca. / approx. 4,5 s
Cavo	Bipolare doppia guaina di isolamento, AWG22 in rame stagnato con resistenza elettrica ≤63 Ω/km - Isolante: tipo TPE specifico ad immersione in acqua su guaina esterna, PPcop. su conduttori interni, Ø esterno 3,5 mm max.
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	acciaio AISI 316 diametro 4 mm - L= 30 mm
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac;
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma



* = vedi tabella codici presente nel listino prezzi

8.3 Modelli PT1*WP*

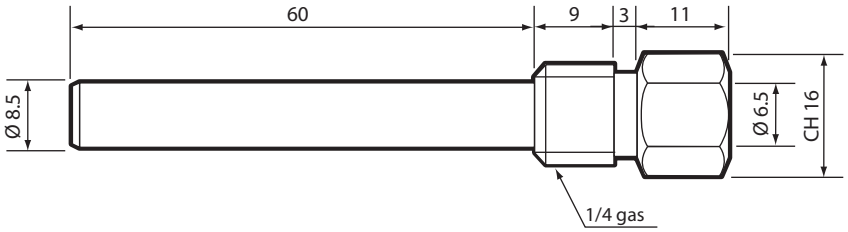
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T105 °C
Connessioni	Terminali spellati, dimensioni: 5±1 mm
Sensore	Pt1000 - Classe B
Fattore di dissipazione (in aria)	ca. / approx. 2,2 mW/°C
Cost. term. nel tempo (in acqua)	ca. / approx.10 s
Cavo	Bipolare doppia guaina di isolamento, AWG22 in rame stagnato con resistenza elettrica ≤63 Ω/km - Isolante: tipo TPE specifico ad immersione in acqua su guaina esterna, PPcop. su conduttori interni, Ø esterno 3,5 mm max
Grado di protezione elemento sensibile	IP68 Immersione in acqua 1 m di profondità per durata 200 h a 70 °C Resistenza in autoclave a vapore saturo 30 min. a 105 °C
Contenitore elemento sensibile	PPcop. con cappuccio AISI 316 esterno
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento supplementare per 250 Vac;
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma



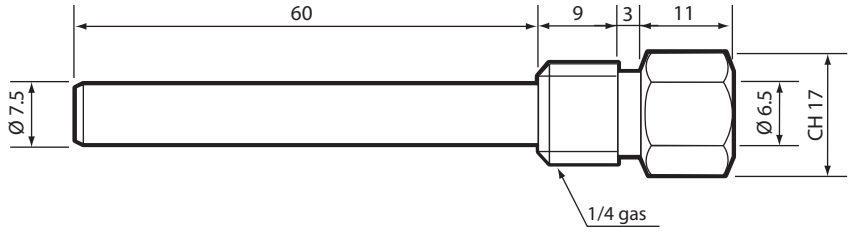
* = vedi tabella codici presente nel listino prezzi

Accessori

Pozzetto: ottone nichelato - 1413306AXX



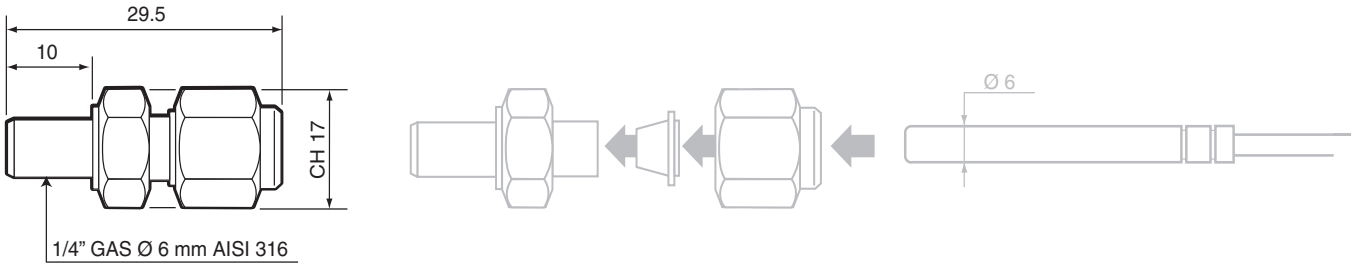
Pozzetto 2: AISI 316 - cod. 1413309AXX



Nota:

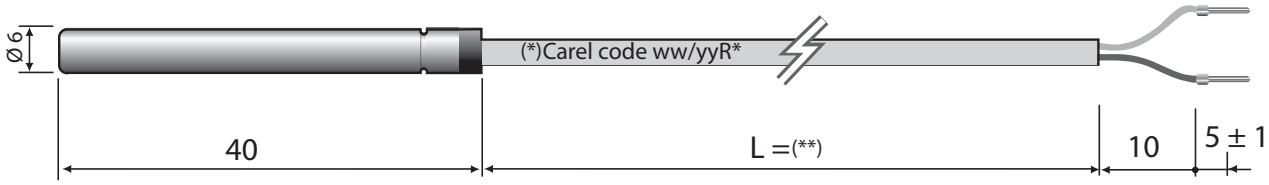
- bloccaggio cavo con passacavo PG7 - IP68 applicato sull' estremità esagonale
- è disponibile il kit completo di pozzetto e pressacavo

Raccordo a compressione con ogiva metallica - cod. 1309589AXX



8.4 Modelli PT1*HT*

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T250 °C
Connessioni	con puntalini su terminali
Sensore	Pt1000 - Class B (2 fili)
Fattore di dissipazione (in aria)	ca. / approx. 7 mW/°C
Cost. term. nel tempo (in acqua)	ca. / approx. 20 s (V=2m/s)
Cavo	Teflon bianco con due fili rosso e bianco . Sezione 2x0,22 mm^2 Ø 3mm
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	Resina silliconica
Materiale cappuccio	Acciaio Aisi 304
Dimensioni cappuccio	6x40 mm
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Insolamento supplementare
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma
Resistenza isolamento	20 Mohm 500 Vcc
Rigidità dielettrica	2000Vac

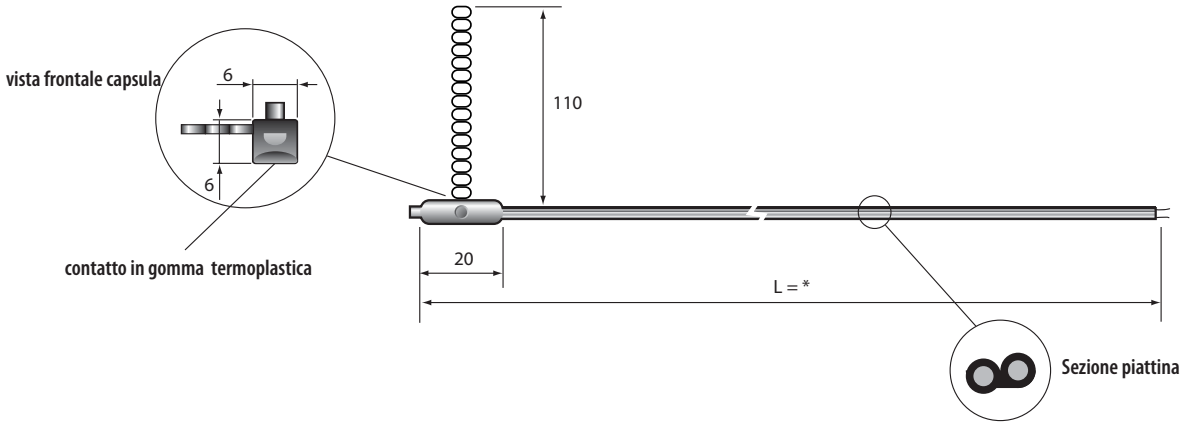


Note:
(*) ww/yyR*:
ww = settimana di produzione;
yy = anno di produzione;
R* = Revisione.
(**) vedi tabella codici presente nel listino prezzi

8.5 Modelli PT1*HF

Sonda con fissaggio a fascetta

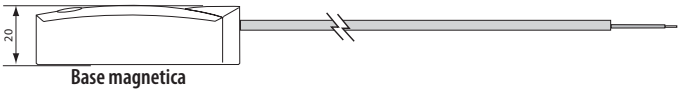
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro elemento sensibile	-50T105 °C
Connessioni	Terminali spelati dimensioni 6±1mm
Sensore	Pt1000 Classe B
Precisione	+/- 0,8 °C; -50T90 °C
Fattore di dissipazione (in aria)	3 mW
Cost. term. nel tempo (in aria)	ca. 15 s
Cavo	Piattina in gomma termoplastica nera (diam. 3,6x1,6 max.)
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	Termoplastico con fascetta di fissaggio
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac
Categoria di resistenza al calore e al fuoco	Cavo UL/HB
Res. isolamento a 1000 Vdc	>20 Mohm
Rigidità dielettrica	1500 Vac



* = vedi tabella codici presente nel listino prezzi

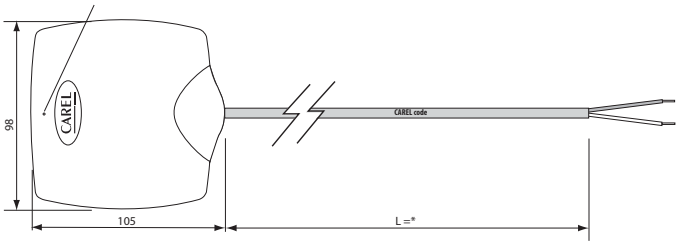
8.6 Modelli PT1*PS*

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T105 °C
Connessioni	Terminali spellati e stagnati dimensioni: 4±1 mm
Sensore	Pt1000 Classe B
Fattore di dissipazione (in aria)	2 mW/°C
Cost. term. nel tempo (in aria)	ca. 50 min (V=1 m/s)
Cavo	Bipolare doppia guaina di isolamento, AWG22 in rame stagnato con resistenza elettrica ≤73.9 Ω/km - Isolante: tipo TPE specifico ad immersione in acqua su guaina esterna, PPcop. Su conduttori interni, Ø esterno 3.30+/-0.10 mm
Grado di protezione elemento sensibile	IP67
Contenitore	Santoprene Grigio RAL7032
	Compatibile per uso alimentare
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac;
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma



Base magnetica

Bucare, nel caso di fissaggio con vite



* = vedi tabella codici presente nel listino prezzi

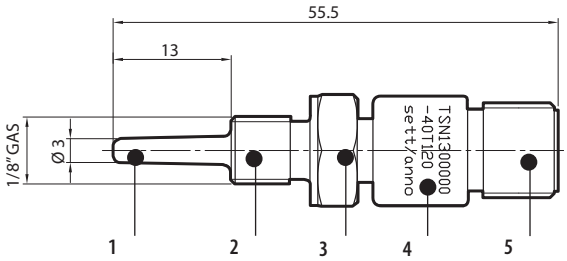
9. CARATTERISTICHE TECNICHE SONDE IMMERSIONE PT1000

9.1 Modello TST1300000

Le sonde ad immersione hanno il sensore direttamente a contatto con il liquido e viene installato sulla tubatura. il collegamento elettrico avviene tramite connettore.

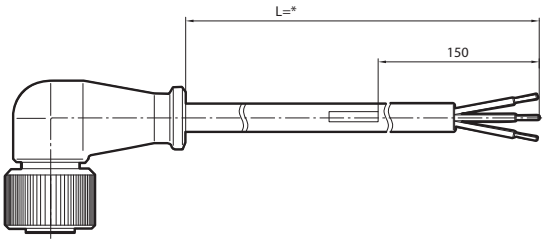
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-40T120 °C
Sensore	Pt1000 Classe B
Costruzione	Ad immersione diretta monolitica con attacco al processo 1/8' GAS UNI 338 maschio
Connessione elettrica	Nylon costampato 4 vie M12x1 (DIN-VDE0627) filettatura met. IP67 Temp. Max 90 °C
Cost. term. nel tempo (in acqua)	ca. / approx. 5 s
Contenitore elemento sensibile	AISI 316
Isolamento	100 Mohm a 500 Vcc
Pressione massima di lavoro	40 bar

1	elemento sensibile NTC 10 Kohn
2	Pozzetto INOX
3	EX14
4	corpo costampato
5	connettore M12 maschio

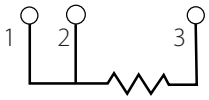


Accessori:

- Connettore 4 poli tipo M12 per sensore 1/8 GAs - lunghezza cavo 3 m
  Cod. TSOPZCW030



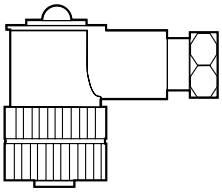
Collegamenti elettrici:

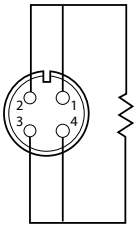


PT1000

1	rosso
2	rosso
3	bianco

- Connettore 4 poli tipo M12 per sensore 1/8 GAS
  Cod. TSOPZCM000
  Connettore M12 assemblabile in opera, cavo consigliato 3x0.2 mmq con guaina esterna.





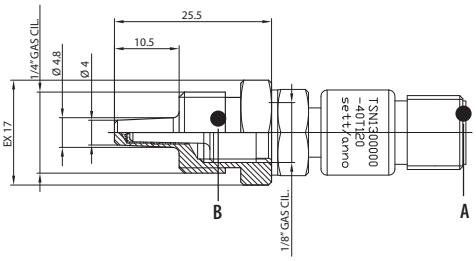
PT1000

Vista sensore lato connettore

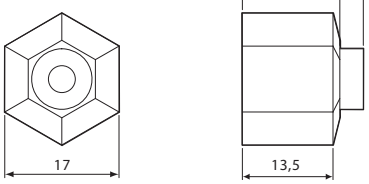
Nota: la connessione a tre fili per pt100, è da fare quando il controllo è predisposto.
In caso non lo fosse, le terminazioni sono da collegare insiemesullo stesso morsetto.

- Raccordo a saldare
  Cod. TSOPZP T000

A	Termoresistenza compatta con attacco 1/8" GAS CIL.
B	Attacco a processo 1/4" GAS CIL. con immersione L= 10,5 mm



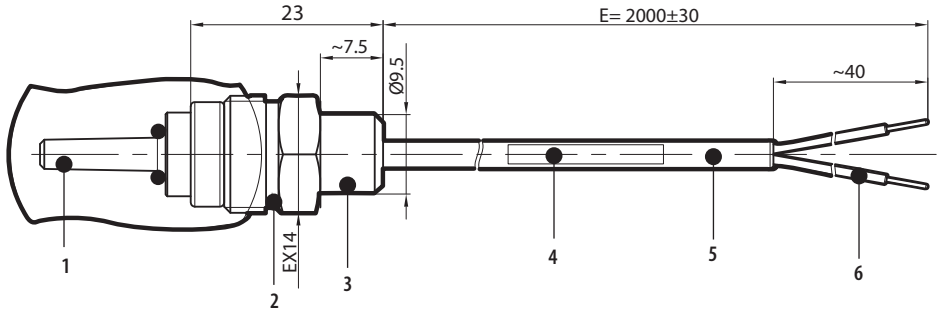
- Raccordo a saldare
  Cod. TSOPZRT000



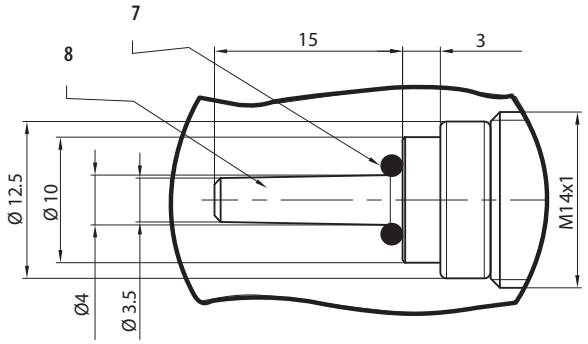
9.2 Modello TSM1500B30

La sonde ad immersione hanno il sensore rimanga direttamente a contatto con il liquido. Il fissaggio alla tubatura avviene tramite raccordo, disponibile nelle versioni a vite o a saldare.
Il corpo è in ottone nichelato con grado di protezione IP67 e la guarnizione di tenuta (o-ring) viene fornita insieme al sensore.

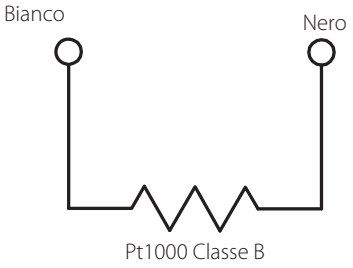
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-40T90 °C
Sensore	Pt1000 Classe B
Costruzione	Ad immersione diretta monolitica con attacco al processo M14 maschio
Cavo	2 conduttori AWG 22, con guaina in TPE
Cost. term. nel tempo (in acqua)	ca. / approx. 5 s
Contenitore elemento sensibile	Ottone nichelato e corpo costampato PA6 grigio
Isolamento	100 Mohm a 100 Vcc
Pressione massima di lavoro	25 bar
Liquidi compatibili	Acqua, Olio



1	elemento sensibile
2	ghiera di fissaggio in ottone nichelato
3	corpo costampato
4	marcatura cavo
5	cavo in rame stagnato a 2 cond
6	sensore NTC
7	oring 2015
8	pozzetto termometrico in ottone nichelato

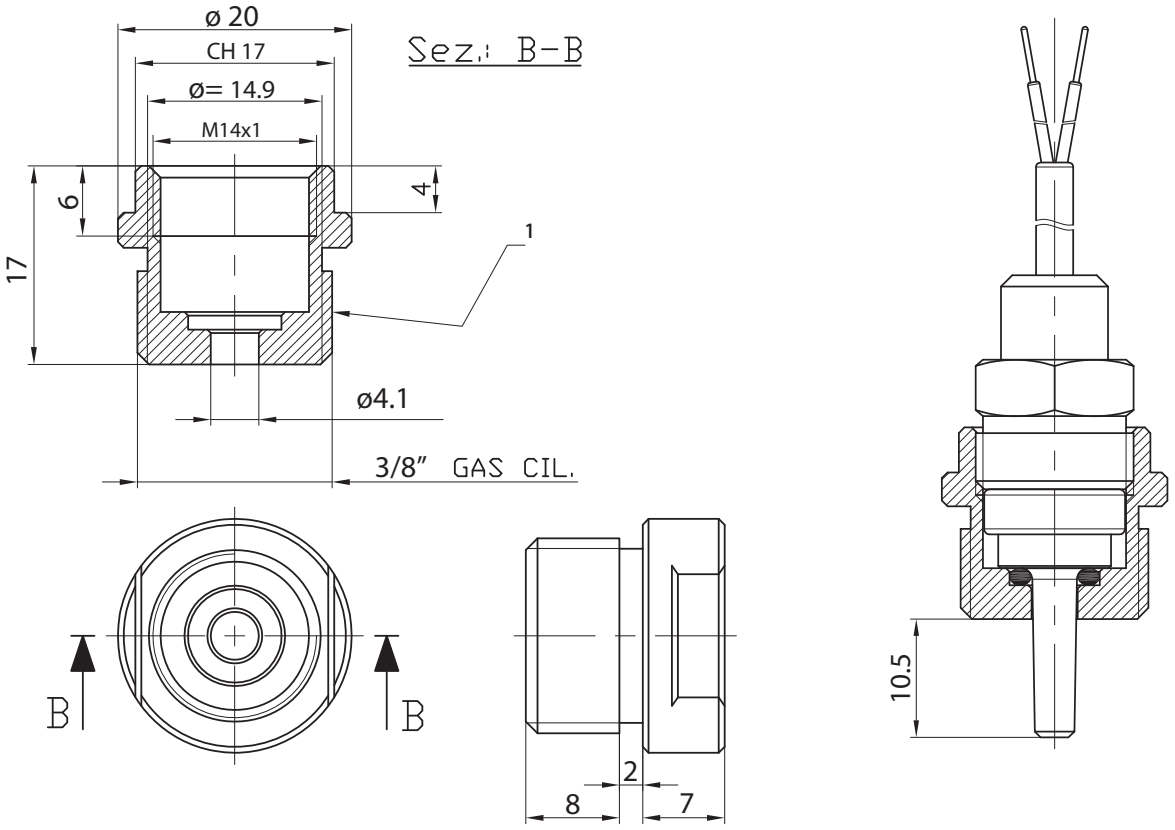


Collegamento elettrico

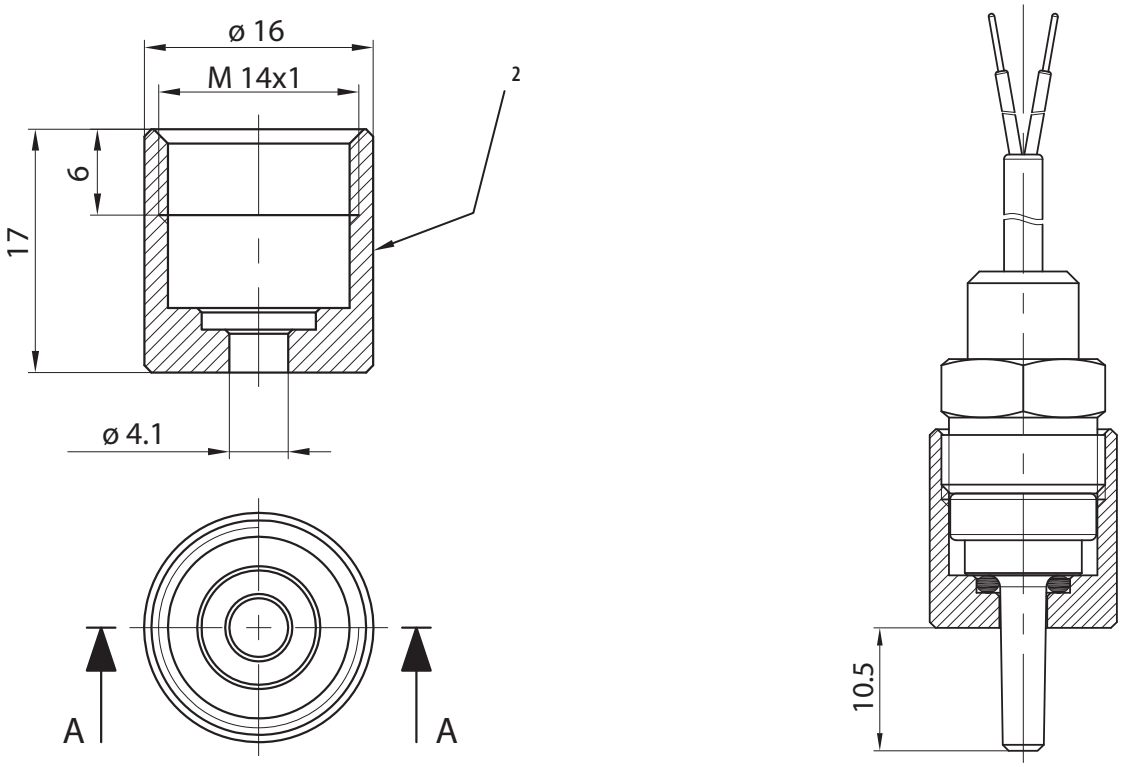


ACCESSORI:

Raccordo adattatore da M14 a 3/8 GAS
Cod.TSOPZRV000



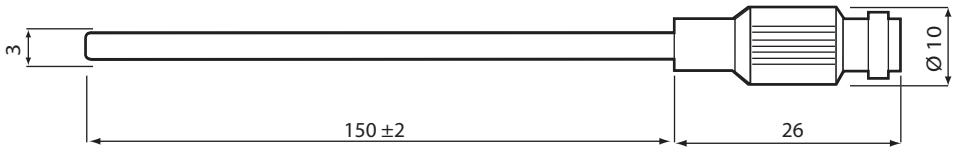
Raccordo adattatore a saldare per M14
Cod.TSOPZRS000



1	attacco filettato 3/8 Cil. con sede tonda Mat. Ottone Nichelato	cod: C058042A04
2	attacco cilindrico a brasare con sede tonda Mat. Ottone	cod. C058042A03

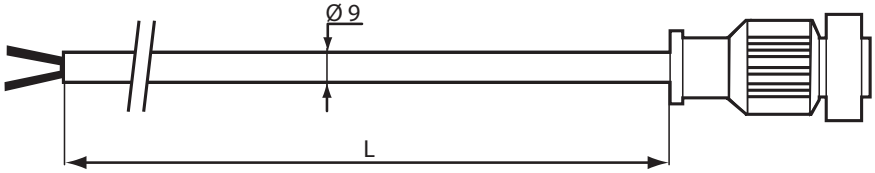
9.3 Modelli TSQ15MAB00

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro elemento sensibile	-50T350 °C
Connessioni	connettore DIN 3 poli
Sensore	Pt1000 Classe B
Cost. term. nel tempo (in acqua)	ca. / approx. 2,5 s
Cavo cod.TSOPZCV030 e cod.TSOPZCV100 e cavo prolunga cod. TSOPZCV070	cavo siliconico L= 3 m, 10 m (T. max.= 180 °C) con connettore DIN 3 poli (T. max. conness.= 90 °C) secondo norme DIN-VDE0627 con innesto avvitato M8x1.
Opzioni raccordo scorrevole cod.TSOPZFGD30	in AISI 316, 1/4 gas (vedi paragrafo 4.4)
Grado di protezione connessione	IP65
Contenitore elemento sensibile	acciaio AISI 316
Resistenza di isolamento	Isolamento a 100 Vdc > 100 M Ohm
Categoria di resistenza al calore e al fuoco	non propagante la fiamma

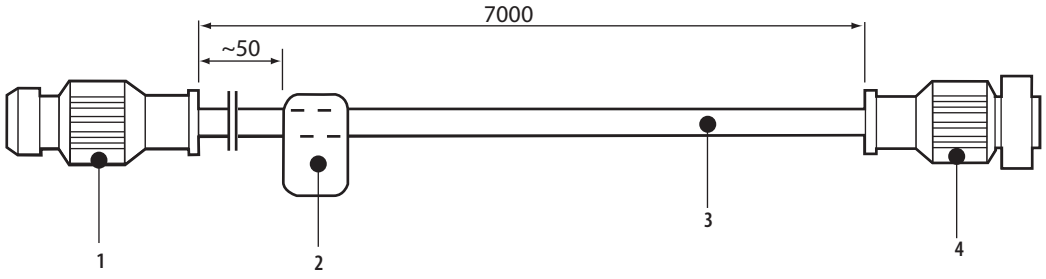


Accessori:

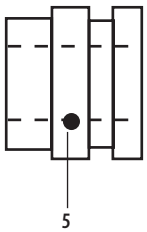
A



B



C



Legenda	
1	connettore M8
2	targhetta adesiva
3	cavo 24 AWG 2 conduttori isolato con gomma silicona
4	connettore M8 Fe costampato
5	raccordo scorrevole a compressione 1/4" - D= 3 mm, Acciaio AISI316

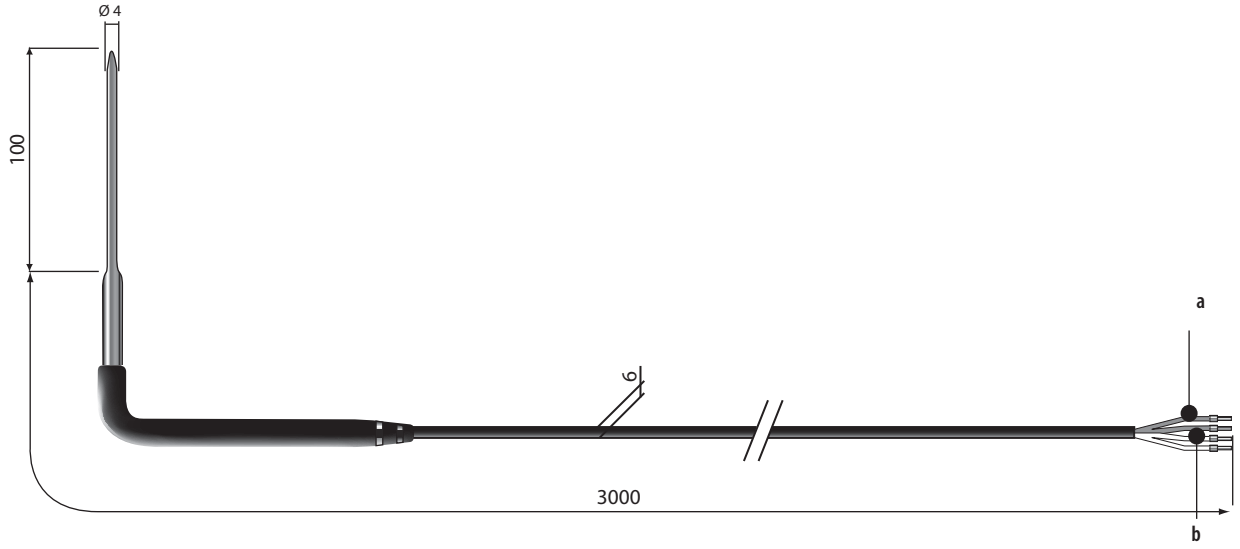
A	TSOPZCV030:	cavo siliconico con connettore M8, con lunghezza di 3 m
	TSOPZCV100:	cavo in silicone con connettore M8, con lunghezza di 10 m
B	TSOPZCV070:	prolunga con cavo siliconico con connettore maschio/femmina M8, con lunghezza di 7 m
C	TSOPZFGD30:	raccordo scorrevole adatto per 3 mm

10. CARATTERISTICHE TECNICHE SONDE AD INFILZAGGIO PT1000

10.1 Modello PT1INF0340

Sonda per infilzaggio con impugnatura 90° con sistema riscaldante.

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T200 °C
Connessioni	Terminali spellati, con puntalini
Sensore	Pt1000 Classe B
Costante term. nel tempo (in acqua)	ca. / approx. 10 s
Cavo	Guaina termoplastica per uso alimentare con 4 fili sez. conduttore 0,15 mm^2
Colori cavo	Bianco-Nero, resistenza PT1000 / Rossi, resistenza elettrica.
Tensione massima della resistenza elettrica	24 Vac
Valore resistenza elettrica di riscaldamento	7 Ohm ±0,6
Lunghezza cavo	3 m
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	Acciaio INOX AISI 316. Lunghezza 100 mm diam. 4 mm. Con punta accumuninata.
Riempitivo del cappuccio	Aluminia.
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolante: Guaina esterna, sia su conduttori interni
Categoria di resistenza al calore e al fuoco	Non propagante la fiamma
Resistenza di isolamento	20 Mohm 500 Vcc
Rigidità	500 Vac



a	rossi, resistenza elettrica
b	bianco/nero, resistenza PT1000

11. CARATTERISTICHE TECNICHE PTC

11.1 Modelli PTC0150000 – PTC0600000

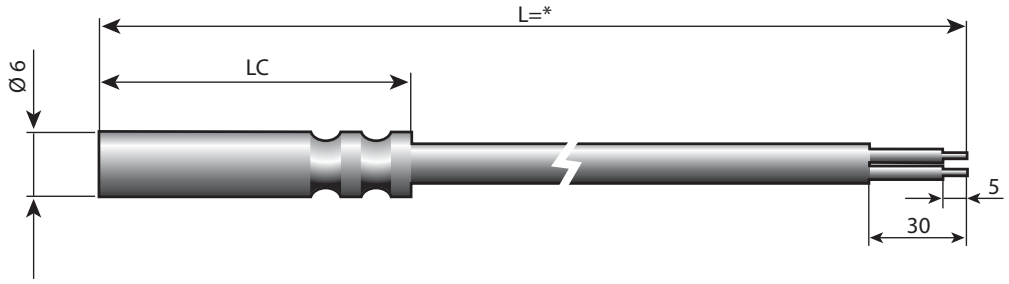
Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	0T150 °C
Connessioni	Terminali spelati dimensioni 6±1mm
Sensore	SEN.KTY81/121-20/5
Precisione	± 2 °C; 0T50 °C;
	± 3 °C; -50T90 °C;
	± 4 °C; 90T120 °C.
Fattore di dissipazione (in aria)	3 mW
Cost. term. nel tempo (in aria) /	ca. 60 s (10 s in acqua)
Cavo	Silicone
Grado di protezione elemento sensibile	IP65
Contenitore elemento sensibile	Dim. 40x6 mm
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac
Res. isolamento a 500 Vdc	>20 MOhm
Rigidità dielettrica	2000 Vac

11.2 Modelli PTC015W000 - PTC060W000 - PTC060WA00

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro	-50T100 °C
Connessioni	Terminali spellati dimensioni 6±1mm
Sensore	SEN.KTY81/121-20/5
Precisione	± 2 °C; 0T50 °C; ± 3 °C; -50T90 °C; ± 4 °C; 90T120 °C.
Fattore di dissipazione (in aria)	3 mW
Cost. term. nel tempo (in aria) /	ca. 60 s (10 s in acqua)
Cavo	Siliconico
Grado di protezione elemento sensibile	IP67
Contenitore elemento sensibile	Dim. 40x6 mm - 180x6 mm (PTC060WA00)
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac
Res. isolamento a 500 Vdc	>20 mOhm
Rigidità dielettrica	2000 Vac

11.3 Modelli PTC03000W1 - PTC03003000D1 - PTC03000G1

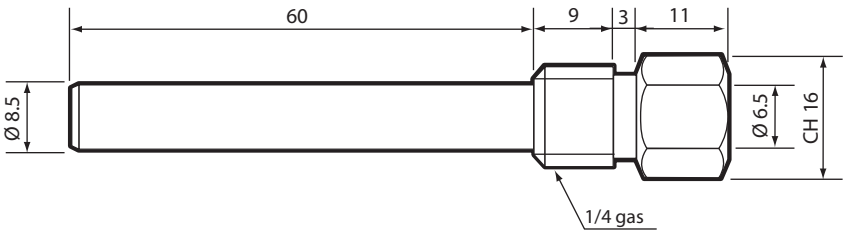
Condizioni di immagazzinamento	-20T70 °C	
Campo di lavoro	PTC03000W1	Range -30*105 °C
	PTC03000D1	Range -30*105 °C
	PTC03000G1	Range -50*120 °C
Connessioni	Terminali spellati dimensioni 6±1mm	
Sensore	SEN.KTY81/121-20/5	
Precisione	± 2 °C; 0T50 °C; ± 3 °C; -50T90 °C; ± 4 °C; 90T120 °C.	
Fattore di dissipazione (in aria)	3 m	
Cost. term. nel tempo (in aria)	ca. 60 s (10 s in acqua)	
Cavo	PVC Nero (PTC03000D1) Silicone grigio (PTC03000G1) PVC Bianco (PTC03000W1)	
Grado di protezione elemento sensibile	IP67	
Contenitore elemento sensibile	Dim. 40x6 mm	
Classificazione secondo la protezione contro le scosse elettriche (elemento sensibile e cavo)	Isolamento principale per 250 Vac	
Res. isolamento a 500 Vdc	>20 MtOhm	
Rigidità dielettrica	2000 Vac	



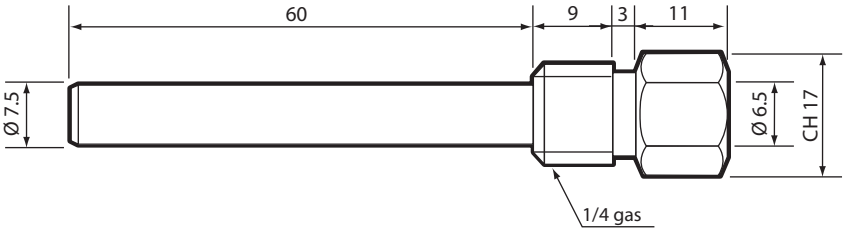
* = vedi tabella codici presente nel listino prezzi

Accessori

Pozzetto: ottone nichelato - 1413306AXX



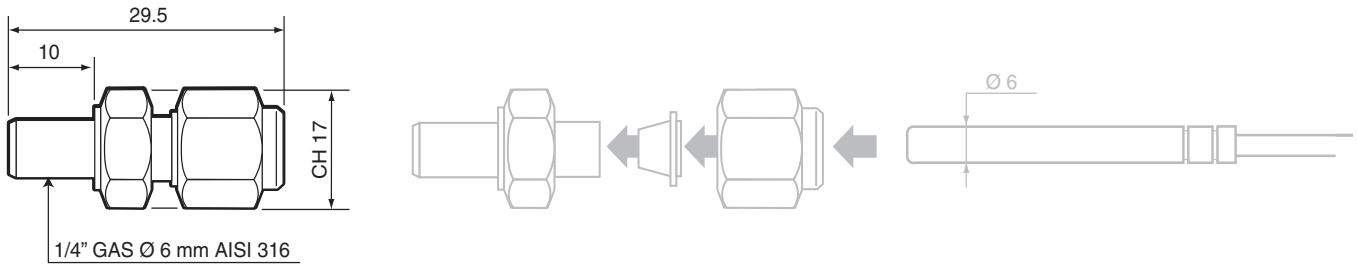
Pozzetto 2: AISI 316 - cod. 1413309AXX



Nota:

- bloccaggio cavo con passacavo PG7 - IP68 applicato sull' estremità esagonale;
- è disponibile il kit completo di pozzetto e pressacavo.

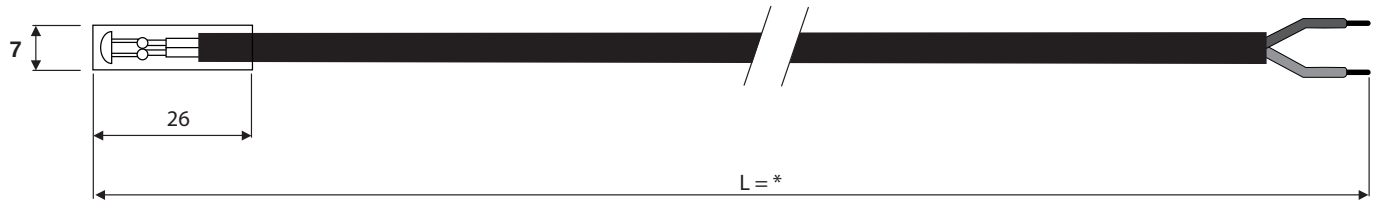
Raccordo a compressione con ogiva metallica - cod. 1309589AXX



12. CARATTERISTICHE TECNICHE SENSORE LUCE

12.1 Modello PSOPZLHT00

Condizioni di immagazzinamento	-20T70 °C
Campo di lavoro elemento sensibile	-20T70 °C
Sensore	Sensore Perkin Elmer optoelectronics A906011
Materiale capsula	Polipropilene trasparente con resina epossidica
Cavo	PVC Nero diam 4,6 mm
Connessioni aliment. e uscita	Terminali spelati dimensioni 6±1mm
Resistenza di isolamento	20 Mohm 500 V
Rigidità dielettrica	2000 Vac
Contenitore elemento sensibile	Polipropilene trasparente
Contenitore elemento sensibile	Dim. 7x26 mm



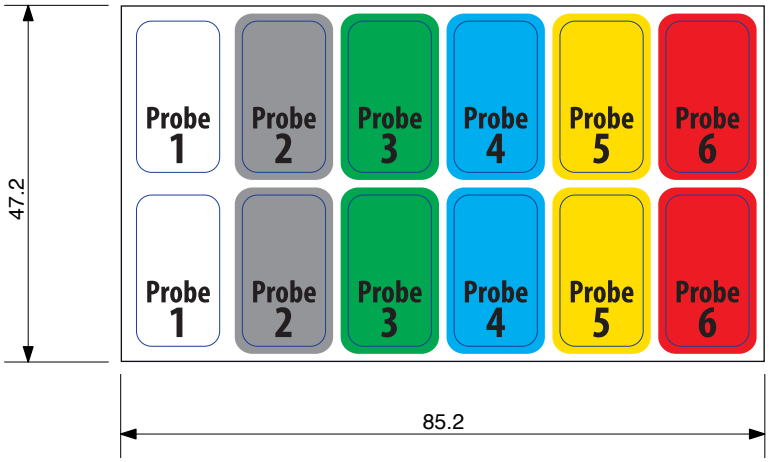
12.2 Caratteristiche elemento sensibile

Tipo	R_{10}	R_{100}	R_{01}	R_{05}	V_{max}	P_{max}	$\gamma_{10/100}$	λ_{peak}
unità	KΩ	KΩ typ.	M Ωmin	MΩ min	V	mW	typ	nm
A 9060 11	9...20	3,5	0,06	0,18	150	90	0,65	600

13. ACCESSORI

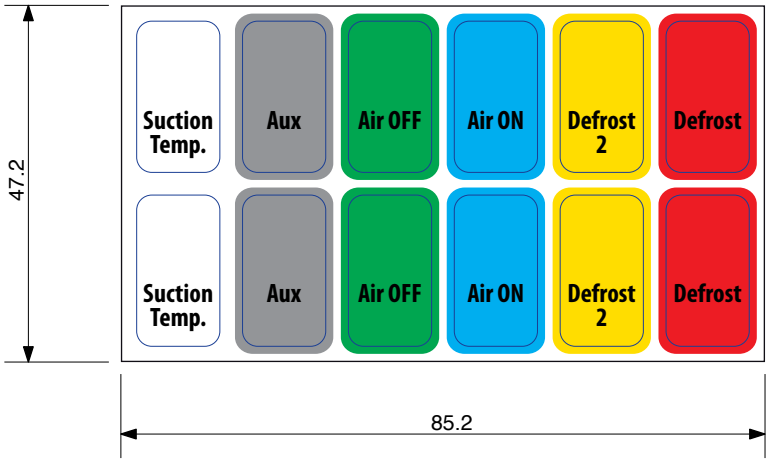
Etichette colorate da applicare all'estremità del sensore che semplificano il collegamento sul controllo per l'installatore

Per applicazioni generali



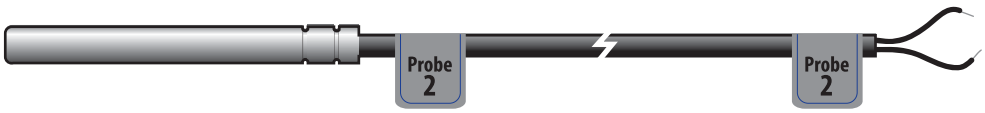
Cod. 62C588A005

Per applicazioni refrigerazione



Cod. 62C588A006

Esempio



CAREL si riserva la possibilità di apportare modifiche o cambiamenti ai propri prodotti senza alcun preavviso.

IMPORTANT

CAREL bases the development of its products on decades of experience in HVAC, on the continuous investments in technological innovations to products, procedures and strict quality processes with in-circuit and functional testing on 100% of its products, and on the most innovative production technology available on the market. CAREL and its subsidiaries nonetheless cannot guarantee that all the aspects of the product and the software included with the product respond to the requirements of the final application, despite the product being developed according to start-of-the-art techniques. The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment. CAREL may, based on specific agreements, acts as a consultant for the positive commissioning of the final unit/application, however in no case does it accept liability for the correct operation of the final equipment/system.

The CAREL product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.carel.com.
Each CAREL product, in relation to its advanced level of technology, requires setup/configuration/programming/commissioning to be able to operate in the best possible way for the specific application. The failure to complete such operations, which are required/indicated in the user manual, may cause the final product to malfunction; CAREL accepts no liability in such cases.
Only qualified personnel may install or carry out technical service on the product.
The customer must only use the product in the manner described in the documentation relating to the product.
In addition to observing any further warnings described in this manual, the following warnings must be heeded for all CAREL products:

- Prevent the electronic circuits from getting wet. Rain, humidity and all types of liquids or condensate contain corrosive minerals that may damage the electronic circuits. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual.
- Do not install the device in particularly hot environments. Too high temperatures may reduce the life of electronic devices, damage them and deform or melt the plastic parts. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual.
- Do not attempt to open the device in any way other than described in the manual.
- Do not drop, hit or shake the device, as the internal circuits and mechanisms may be irreparably damaged.
- Do not use corrosive chemicals, solvents or aggressive detergents to clean the device.
- Do not use the product for applications other than those specified in the technical manual.

All of the above suggestions likewise apply to the controllers, serial boards, programming keys or any other accessory in the CAREL product portfolio.
CAREL adopts a policy of continual development. Consequently, CAREL reserves the right to make changes and improvements to any product described in this document without prior warning.
The technical specifications shown in the manual may be changed without prior warning.
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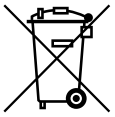
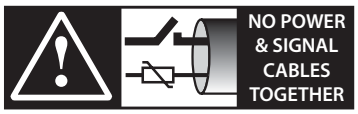
DISPOSAL OF THE PRODUCT



The product is made up of metal parts and plastic parts.
In reference to European Union directive 2002/96/EC issued on 27 January 2003 and the related national legislation, please note that:

1. WEEE cannot be disposed of as municipal waste and such waste must be collected and disposed of separately;
2. the public or private waste collection systems defined by local legislation must be used. In addition, the equipment can be returned to the distributor at the end of its working life when buying new equipment;
3. the equipment may contain hazardous substances: the improper use or incorrect disposal of such may have negative effects on human health and on the environment;
4. the symbol (crossed-out wheeled bin) shown on the product or on the packaging and on the instruction sheet indicates that the equipment has been introduced onto the market after 13 August 2005 and that it must be disposed of separately;
5. in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

If the appliance is used in a way that is not described by the manufacturer, the specified level of protection may be affected.



READ CAREFULLY IN THE TEXT!

WARNING: separate as much as possible the probe and digital input signal cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance.
Never run power cables (including the electrical panel wiring) and signal cables in the same conduits

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1. INTRODUCTION

1.1 General description

The Carel passive temperature probes are devices that, when connected to the controller, provide a resistance value, which is then converted to a temperature by the electronic controller. These are used in HVAC/R applications, and represent a complete range capable of satisfying a variety of needs in different installations. The probes are made using materials that guarantee constant quality.

The range includes various models that differ based on the performance of the system and the fields of application. The probes have different types of sensor (NTC, PTC, Pt1000), caps, index of protection, cable length, operating ranges and mechanical dimensions.

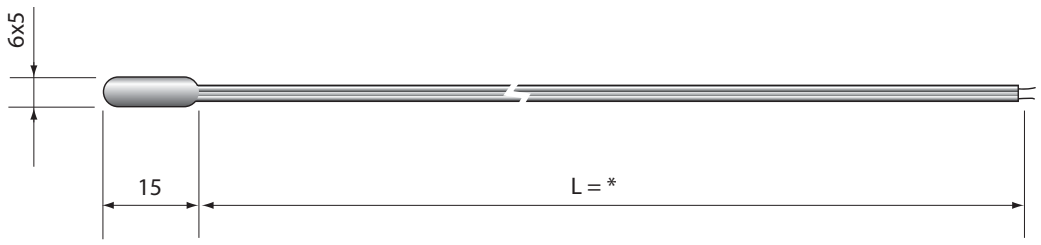
In addition, models are available for use in hydronic systems, applied directly onto the tubing, which simplify installation and offer a faster response in the reading, improving the wiring of the HVAC/R unit and improving performance.

The probes are used together with Carel electronic controllers (parametric and programmable).

2. NTC TECHNICAL SPECIFICATIONS

2.1 Models NTC*HP*

Storage conditions	-20T70 °C
Operating range	-50T105 °C in air
	-50T50 °C in fluid
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kΩ ±1% at 25 °C Beta 3435
Dissipation factor (in air)	approx. 3 mW/°C
Thermal constant over time (in air)	approx. 75 s
Cable	Black two-wire flat cable, with tinned copper wire size 0.3 mm^2
Sensitive element index of protection	IP67
Sensitive element housing	Polyolefin
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant
Standard	NSF

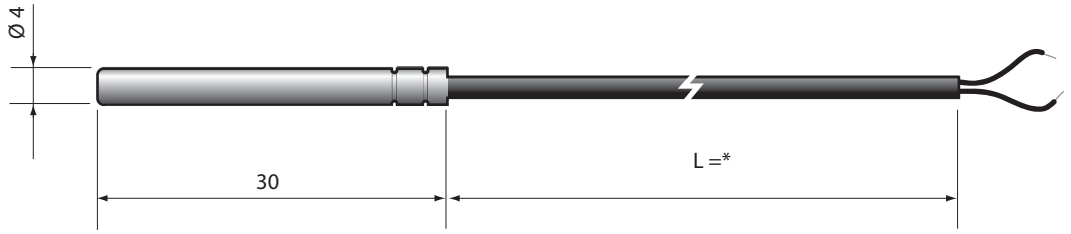


* = see table of product codes in price list

Warning: all measures present in this manual are in millimeters.

2.2 Models NTC*WF*

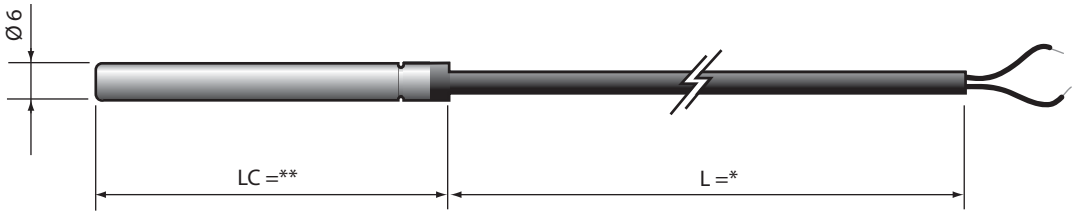
Storage conditions	-20T70 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kΩ ±1% at 25 °C Beta 3435
Dissipation factor (in air)	approx. 7 mW/°C
Thermal constant over time (in water)	approx. 4.5 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max.
Sensitive element index of protection	IP67
Sensitive element housing	AISI 316 steel diameter 4 mm - L= 30 mm
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac;
Category of resistance to heat and fire	Flame retardant



* = see table of product codes in price list

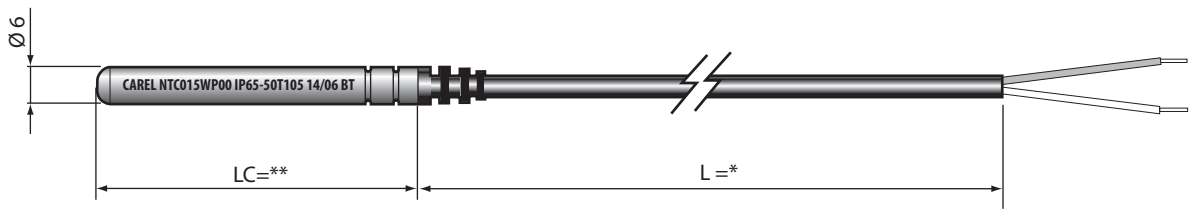
2.3 Models NTC*WP*

Storage conditions	-20T70 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kΩ ±1% at 25 °C Beta 3435
Dissipation factor (in air)	approx. 2.2 mW/°C
Thermal constant over time (in water)	approx. 20 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max
Sensitive element index of protection	IP68 Immersion in water 1 m depth for 200 h at 70 °C Resistance in autoclave to saturated steam 30 min. at 105 °C
Sensitive element housing	PP/Co with AISI 316 outer cap
Classification according to protection against electric shock (sensitive element & cable)	Supplementary insulation for 250 Vac;
Category of resistance to heat and fire	Flame retardant
Standard	NSF



Version 1

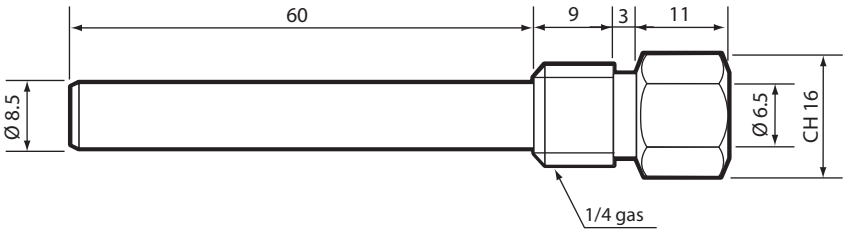
* = see table of product codes in price list
* *= 52/100/200/300(mm dimension)



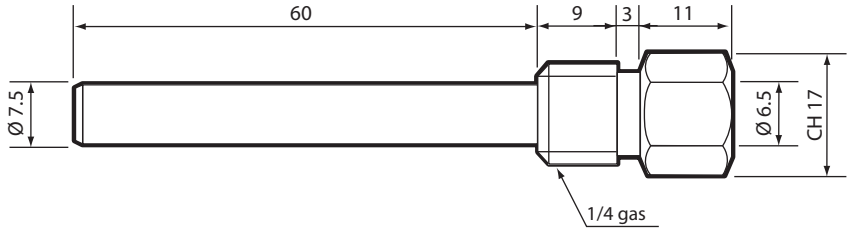
Version 2

Accessories

Socket: nickel-coated brass - 1413306AXX



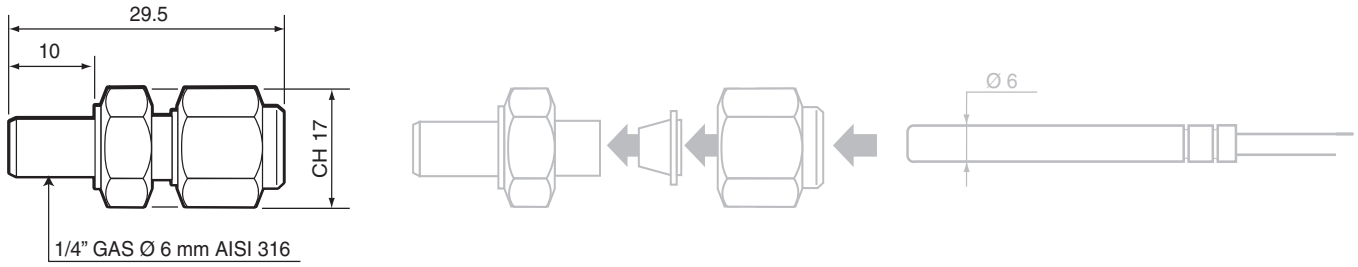
Socket 2: AISI 316 - code 1413309AXX



Note:

- cable secured with PG7 - IP68 cable gland applied to hexagonal end
- kit available complete with socket and cable gland

Compression fitting with metal olive - code 1309589AXX



2.4 Models NTC*WG*

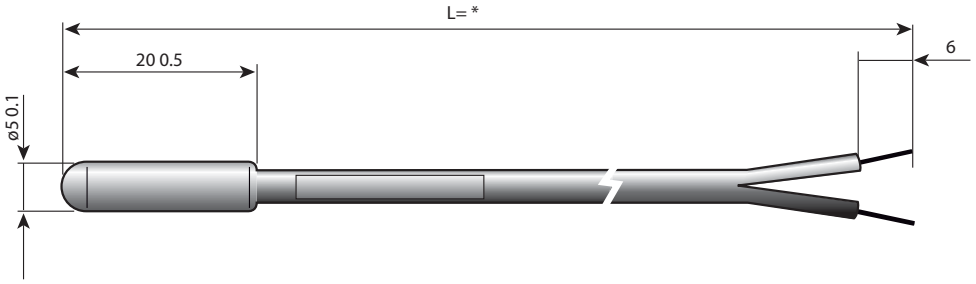
Storage conditions	-20T70 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kΩ ±1% at 25°C Beta 3435
Dissipation factor (in air)	approx. 1 mW/°C
Thermal constant over time (in air)	approx. 10 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max.
Sensitive element index of protection	IP67 (polyurethane resin)
Sensitive element housing	Aluminium 6x6x40
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac;
Category of resistance to heat and fire	Flame retardant

Cap for probe sensor

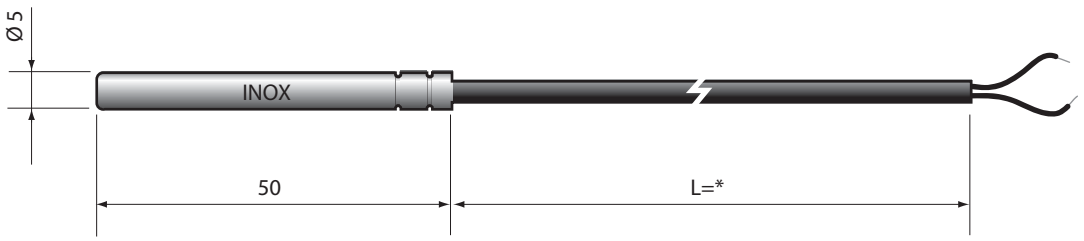
2.5 Models NTC*HT*

Storage conditions	-20T70 °C
Operating range	150 °C in air
Connections	Stripped ends, dimensions 6±1mm
Sensor	R(25 °C)= 50 kOhm 1%; Beta (25/85)3977±1%
Precision	+/- 0.5 °C; -10T50 °C +/- 1.0 °C; -50T85 °C +/- 1.6 °C; +85T120 °C +/- 2.1 °C; +120T150 °C
Dissipation factor (in air)	approx. 3 mW
Thermal constant over time (in air)	approx. 60 s
Cable	High temperature polyester (diam. 4x2 max.)
Sensitive element index of protection	IP55
Sensitive element housing	High temperature polyester dim. 20x5 mm (available in version with AISI 316 stainless steel cap)
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	In accordance with CEI 20-35
Insulation resistance at 1000 Vdc	>100 mOhm
Dielectric strength	1500 Vac

Note: the NTC*HT probes cannot be used with extended exposure to water and must not be used at temperatures below 0 °.



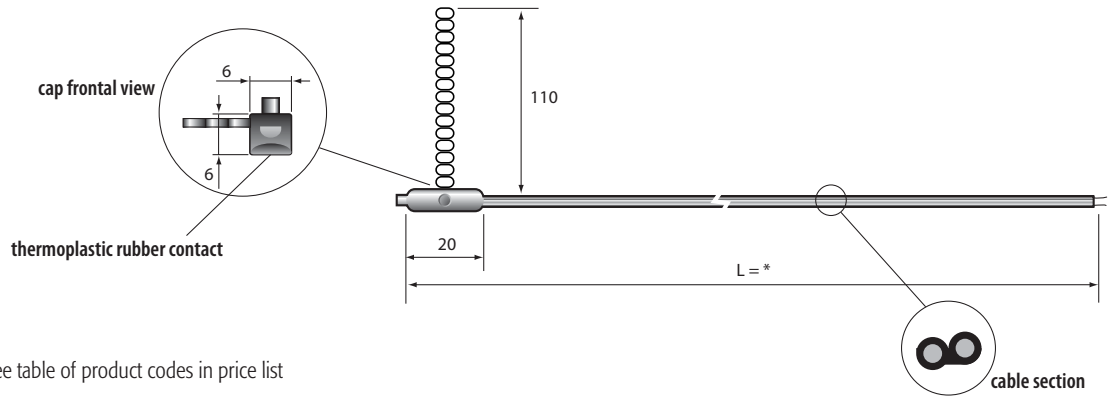
Version with stainless steel cap



* = see table of product codes in price list

2.6 Models NTC*HF*

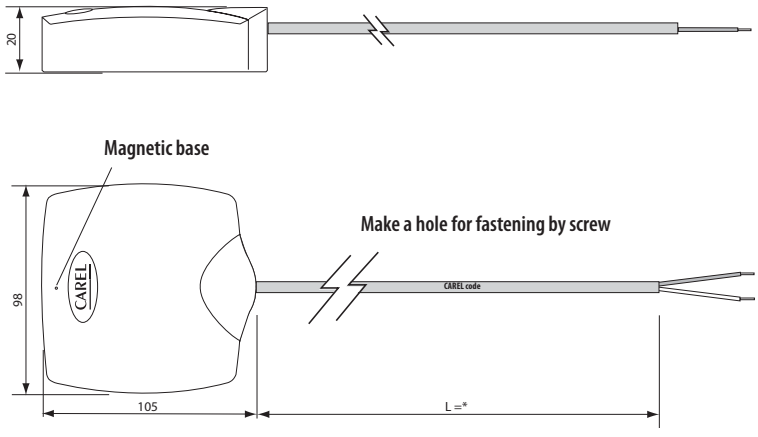
Storage conditions	-20T70 °C
Operating range	-50T90 °C
Connections	Stripped ends, dimensions 6±1mm
Sensor	R(25 °C)= 10 kOhm 1%; Beta 3435
Precision	+/- 0.5 °C at 25 °C; +/- 1.0 °C from -50T90 °C
Dissipation factor (in air)	3 mW
Thermal constant over time (in water)	approx. 15 s
Cable	Black, thermoplastic rubber flat cable (diam. 3.6x1.6 max.)
Sensitive element index of protection	IP67
Sensitive element housing	Thermoplastic with fastening clamp
Class. according to protection against electric shock	Basic insulation for 250 Vac
Category of resistance to heat and fire	UL/HB cable
Insulation resistance at 500 Vdc	>20 mOhm
Dielectric strength	1500 Vac



* = see table of product codes in price list

2.7 Models NTC*PS*

Storage conditions	-20T70 °C
Operating range	-50T105 °C
Connections	Stripped and soldered ends, dimensions: 4±1 mm
Sensor	NTC 10 kΩ ±1% a 25 °C Beta 3435
Dissipation factor (in air)	2 mW/°C
Thermal constant over time (in air)	ca. / approx. 50 min (V=1 m/s)
Cable	Two-wire with double sheath, AWG22, tinned copper with resistance ≤73.9Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/co inside on wires, OD 3.30+/-0.10 mm
Sensitive element index of protection	IP67
Case	RAL7032 grey Santoprene Food safe
Classification according to protection against electric shock (sensitive element & cable)	Supplementary insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant



* = see table of product codes in price list

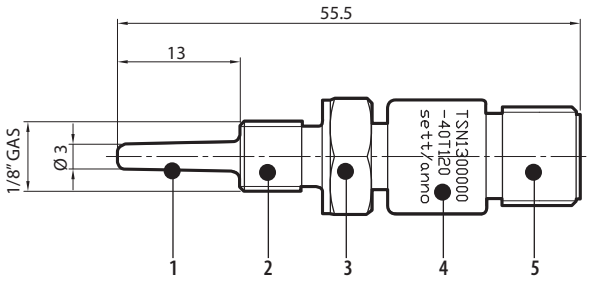
3. NTC IMMERSION PROBE TECHNICAL SPECIFICATIONS

3.1 Model TSN1300000

Immersion probes feature the sensor directly in contact with the liquid, and are installed on the tubing. Wired using the electrical connector.

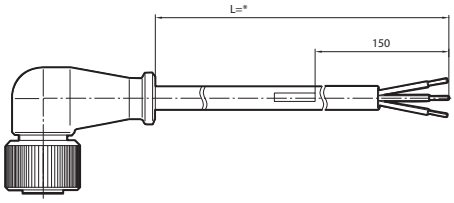
Storage conditions	-20T70 °C
Operating range	-40T120 °C
Sensor	NTC 10 kΩ ±1% at 25 °C Beta 3435
Construction	Direct immersion with connection to the 1/8" GAS male process fitting as per UNI 338
Electrical connection	4-pin co-moulded nylon, M12x1 (DIN-VDE0627) metric thread, IP67 max. temp. 90 °C
Thermal const. over time (in water)	approx. 5 s
Sensitive element housing	AISI 316
Insulation	100 Mohm at 500 Vdc
Maximum operating pressure	40 bars

1	NTC sensitive element 10 Kohm
2	Stainless steel socket
3	EX14
4	Co-moulded body
5	M12 male connector

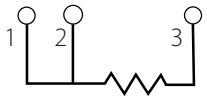


Accessories:

- 4-pin M12 connector for 1/8 GAS sensor - cable length 3 m
  Code TSOPZCW030



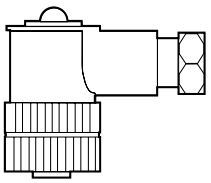
Wiring:

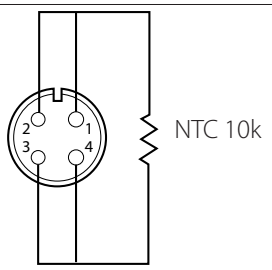


NTC 10kohm

1	red
2	red
3	white

- 4-pin M12 connector for 1/8 GAS sensor
  Code TSOPZCM000
  M12 connector can be assembled on site, recommended cable 3x0.2 mm² with outer sheath.

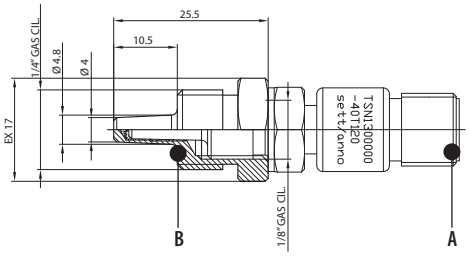




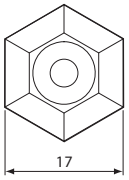
Sensor connector side view

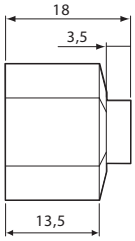
- Probe socket 1/4 Gas
  Code TSOPZPT000

A	1/8" GAS cyl. fitting for sensor
B	1/4" GAS cyl. process fitting with immersion L= 10.5 mm



- Welding fitting
  Code TSOPZCW030

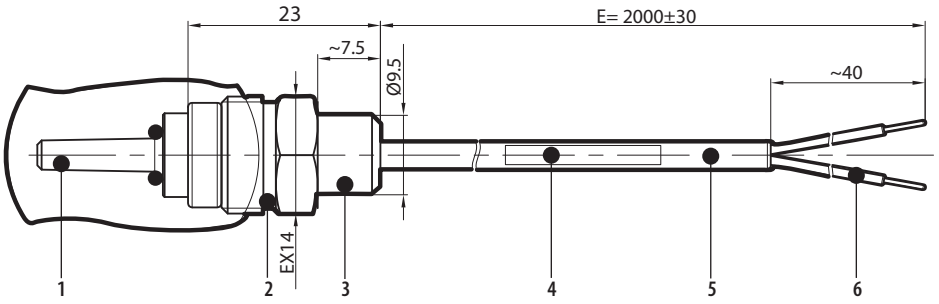




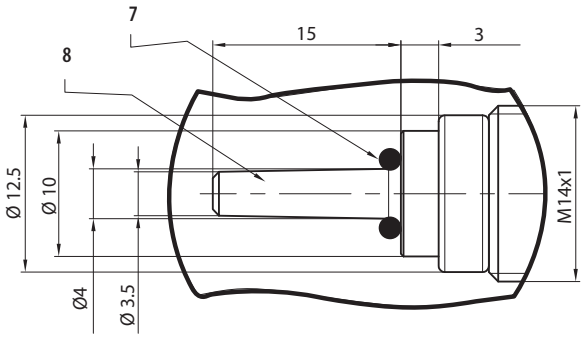
3.2 Model TSC1500030

Immersion probes feature the sensor directly in contact with the liquid and are secured to the tubing using a connector, available in the screw or weldable versions.
The body is nickel-coated brass, index of protection IP67, and the gasket (O-ring) is supplied together with the probe.

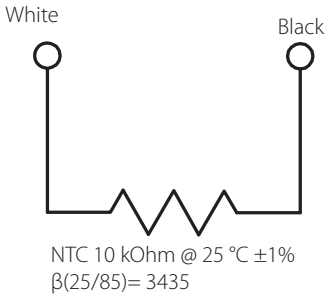
Storage conditions	-20T70 °C
Operating range	-40T90 °C
Sensor	NTC 10 kΩ ±1% at 25 °C Beta 3435
Construction	Direct immersion with connection to M14 male process fitting
Cable	2 wires AWG 22, with TPE sheath
Thermal constant over time (in water)	approx. 5 s
Sensitive element housing	Nickel-coated brass & grey PA6 co-moulded body
Insulation	100 Mohm at 100 Vdc
Maximum operating pressure	25 bar
Compatible liquids	Water, Oil



1	sensitive element
2	nickel-coated brass locking ring
3	co-moulded body
4	cable marking
5	tinned copper 2-wire cable
6	NTC sensor
7	2015 O-ring
8	nickel-coated brass thermometer socket

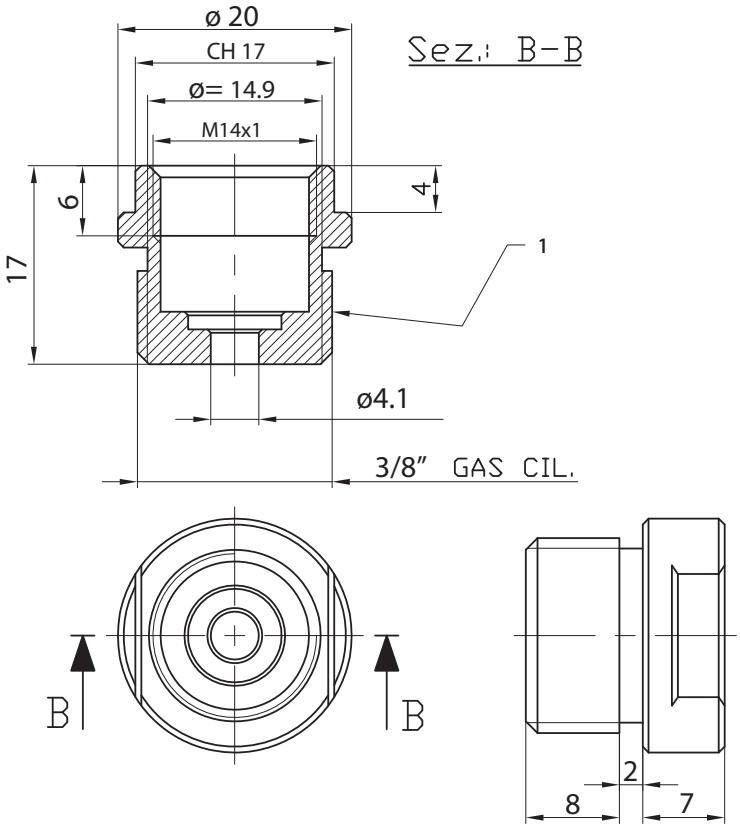


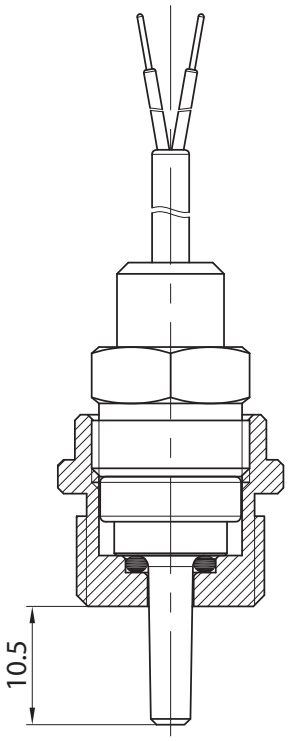
Wiring



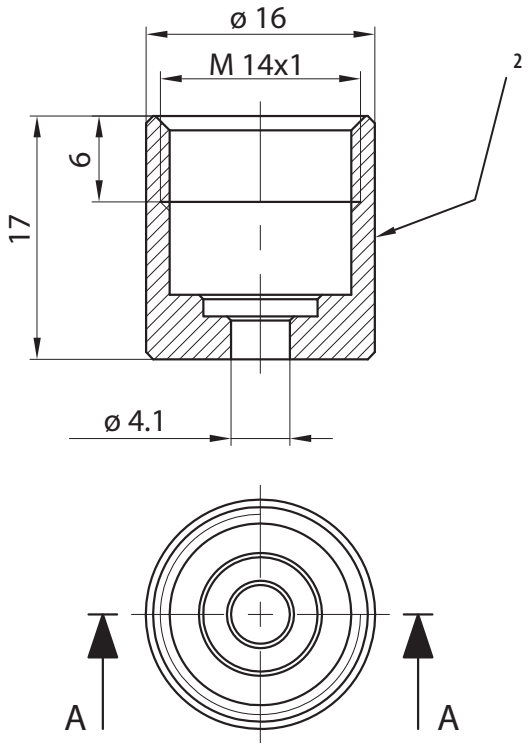
Accessories:

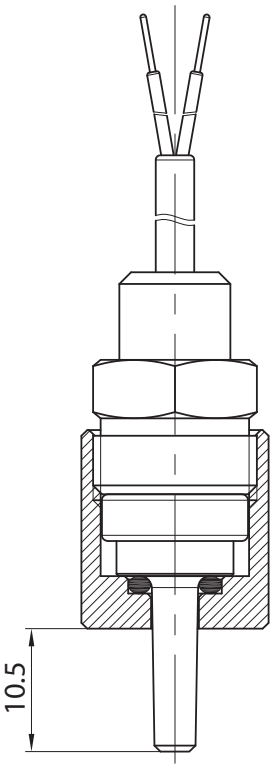
Adapter from M14 to 3/8 GAS
Code TSOPZRV000





Weldable adapter for M14
Code TSOPZRS000





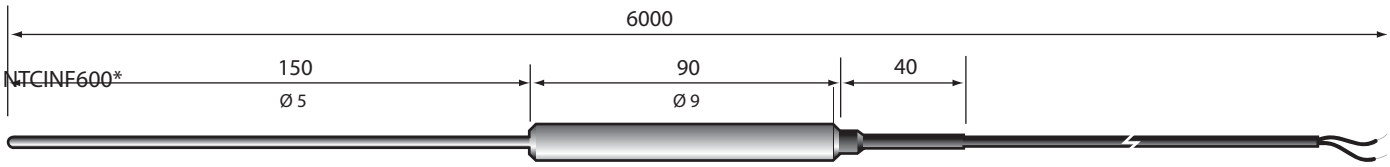
1	3/8 cyl. threaded fitting with round seat, nickel-coated brass	code: C058042A04
2	weldable cylindrical fitting with round seat, brass	code C058042A03

4. NTC PIERCING PROBE TECHNICAL SPECIFICATIONS

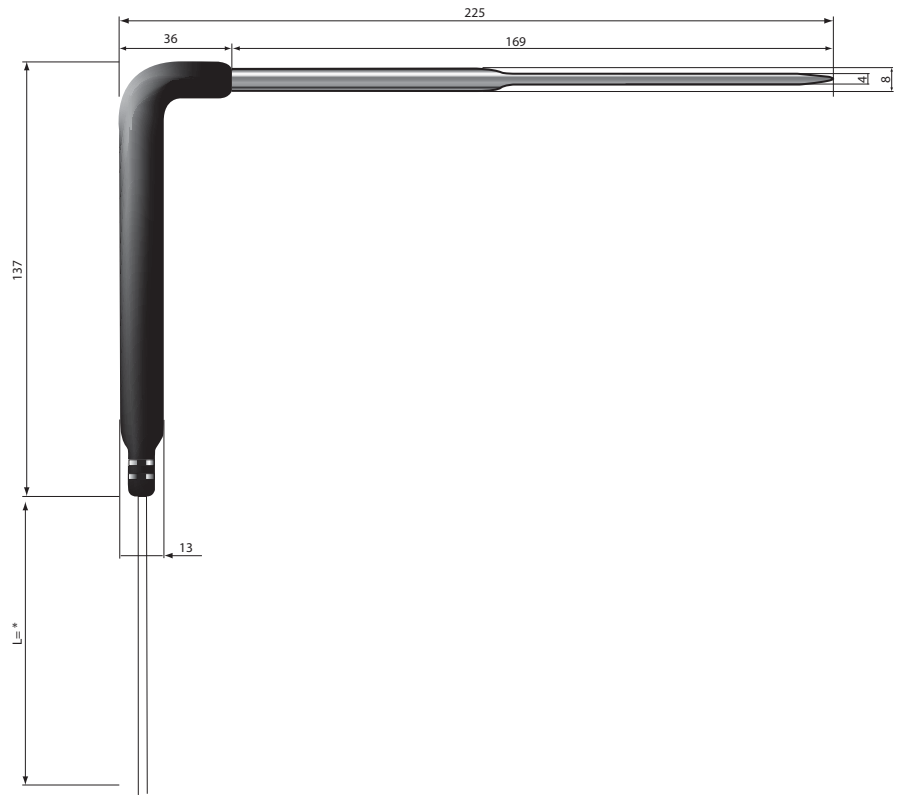
4.1 Models NTC*INF*

Piercing probes with "L" and "T" handle

Storage conditions	-20T70 °C
Operating range	-50T90 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	NTC 10 kOhm ±1% at 25 °C Beta 3435
Dissipation factor (in air)	approx. 2.2 mW/°C
Thermal constant over time (in air)	approx. 10 s
Cable	Two-wire with double sheath, tinned copper wire size 0.35 mm^2 with electrical resistance ≤63 Ohm/km
Sensitive element index of protection	IP67
Sensitive element housing	AISI 304 stainless steel with silicone resin filling
Classification according to protection against electric shock (sensitive element & cable)	Insulation: silicone both on outer sheath and inside on wires
Category of resistance to heat and fire	Flame retardant



NTCINF610*

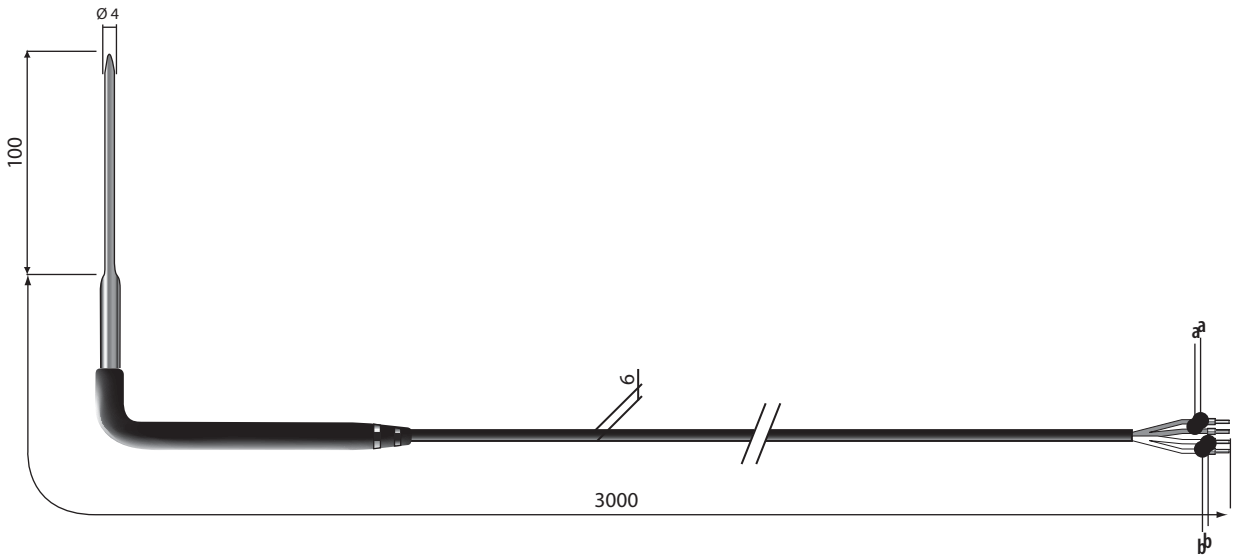


* = see table of product codes in price list

4.2 Model NTCINF0340

Piercing probe with "L" handle and heating system

Storage conditions	-20T70 °C
Operating range	-50T90 °C
Connections	Stripped ends, with terminals
Sensor	NTC 10 kOhm ±1% at 25 °C Beta 3435
Thermal constant over time (in water)	approx. 10 s
Cable	Food-safe thermoplastic sheath with 4 wires size 0.15 mm^2
Wire colours	White-black, NTC / red, electric heater.
Maximum heater voltage	24 Vac
Electrical resistance of heater	7 Ohm ±0.6
Cable length	3 m
Sensitive element index of protection	IP67
Sensitive element housing	AISI 316 stainless steel. Length 100 mm diam. 4 mm. With pointed tip.
Cap filler	Aluminium
Classification according to protection against electric shock (sensitive element & cable)	Insulation: Outer sheath, and inside on wires
Category of resistance to heat and fire	Flame retardant
Insulation resistance	20 Mohm 500 Vdc
Dielectric strength	500 Vac



a	red, electric heater
b	white/black, NTC

5. TABLE OF TEMPERATURE VALUES

Table of temperature-resistance values for NTC sensor 10K@25°C ß 3435

Temp.	Resistance value		
	Max.	Typical	Min.
°C	KΩ	KΩ	KΩ
-50	344,60	329,50	314,90
-49	325,00	310,90	297,30
-48	306,60	293,50	280,90
-47	289,40	277,20	265,40
-46	273,40	262,00	251,00
-45	258,30	247,70	237,40
-44	244,20	234,30	224,70
-43	231,00	221,70	212,80
-42	218,60	209,90	201,60
-41	207,00	198,90	191,00
-40	196,00	188,50	181,10
-39	185,50	178,50	171,60
-38	175,60	169,00	162,60
-37	166,30	160,20	154,20
-36	157,60	151,90	146,30
-35	149,40	144,10	138,80
-34	141,70	136,70	131,80
-33	134,50	129,80	125,20
-32	127,70	123,30	119,00
-31	121,20	117,10	113,10
-30	115,20	111,30	107,50
-29	109,40	105,70	102,20
-28	103,90	100,50	97,20
-27	98,68	95,52	92,45
-26	93,80	90,84	87,97
-25	89,20	86,43	83,73
-24	84,85	82,26	79,74
-23	80,76	78,33	75,96
-22	76,89	74,61	72,39
-21	73,23	71,10	69,01
-20	69,77	67,77	65,82
-19	66,44	64,57	62,74
-18	63,30	61,54	59,83
-17	60,32	58,68	57,07
-16	57,51	55,97	54,46
-15	54,85	53,41	51,99
-14	52,33	50,98	49,65
-13	49,95	48,68	47,43
-12	47,69	46,50	45,32
-11	45,55	44,43	43,33
-10	43,52	42,47	41,43
-9	41,55	40,57	39,60
-8	39,69	38,77	37,86
-7	37,92	37,06	36,21
-6	36,25	35,44	34,64
-5	34,66	33,90	33,15
-4	33,15	32,44	31,73
-3	31,72	31,05	30,39
-2	30,36	29,73	29,11
-1	29,06	28,48	27,89
0	27,83	27,28	26,74

Temp.	Resistance value		
	Max.	Typical	Min.
°C	KΩ	KΩ	KΩ
1	26,65	26,13	25,62
2	25,52	25,03	24,55
3	24,44	23,99	23,54
4	23,42	23,00	22,57
5	22,45	22,05	21,66
6	21,53	21,15	20,78
7	20,64	20,30	19,95
8	19,81	19,48	19,15
9	19,01	18,70	18,39
10	18,25	17,96	17,67
11	17,51	17,24	16,97
12	16,81	16,56	16,30
13	16,14	15,90	15,67
14	15,50	15,28	15,06
15	14,89	14,69	14,48
16	14,31	14,12	13,92
17	13,75	13,58	13,39
18	13,22	13,06	12,89
19	12,72	12,56	12,40
20	12,24	12,09	11,94
21	11,77	11,63	11,50
22	11,32	11,20	11,07
23	10,90	10,78	10,66
24	10,49	10,38	10,27
25	10,10	10,00	9,90
26	9,73	9,63	9,53
27	9,38	9,28	9,18
28	9,04	8,94	8,84
29	8,72	8,62	8,52
30	8,41	8,31	8,21
31	8,11	8,01	7,92
32	7,83	7,73	7,63
33	7,55	7,45	7,36
34	7,29	7,19	7,10
35	7,04	6,94	6,85
36	6,79	6,70	6,61
37	6,56	6,47	6,37
38	6,34	6,25	6,15
39	6,12	6,03	5,94
40	5,92	5,83	5,74
41	5,72	5,63	5,54
42	5,53	5,44	5,35
43	5,34	5,26	5,17
44	5,17	5,08	4,99
45	5,00	4,91	4,83
46	4,83	4,75	4,67
47	4,68	4,59	4,51
48	4,52	4,44	4,36
49	4,38	4,30	4,22
50	4,24	4,16	4,08
51	4,10	4,03	3,95
52	3,97	3,90	3,82
53	3,85	3,77	3,70
54	3,73	3,65	3,58
55	3,61	3,54	3,46

Temp.	Resistance value		
	Max.	Typical	Min.
°C	KΩ	KΩ	KΩ
56	3,50	3,43	3,35
57	3,39	3,32	3,25
58	3,28	3,22	3,15
59	3,18	3,12	3,05
60	3,09	3,02	2,95
61	2,99	2,93	2,86
62	2,90	2,84	2,77
63	2,82	2,75	2,69
64	2,73	2,67	2,61
65	2,65	2,59	2,53
66	2,57	2,51	2,45
67	2,50	2,44	2,38
68	2,42	2,36	2,31
69	2,35	2,30	2,24
70	2,28	2,23	2,17
71	2,22	2,16	2,11
72	2,15	2,10	2,05
73	2,09	2,04	1,99
74	2,03	1,98	1,93
75	1,98	1,92	1,87
76	1,92	1,87	1,82
77	1,87	1,82	1,77
78	1,81	1,77	1,72
79	1,76	1,72	1,67
80	1,72	1,67	1,62
81	1,67	1,62	1,58
82	1,62	1,58	1,53
83	1,58	1,53	1,49
84	1,54	1,49	1,45
85	1,49	1,45	1,41
86	1,45	1,41	1,37
87	1,42	1,37	1,33
88	1,38	1,34	1,30
89	1,34	1,30	1,26
90	1,31	1,27	1,23
91	1,27	1,23	1,19
92	1,24	1,20	1,16
93	1,21	1,17	1,13
94	1,17	1,14	1,10
95	1,14	1,11	1,07
96	1,12	1,08	1,04
97	1,09	1,05	1,02
98	1,06	1,02	0,99
99	1,03	1,00	0,97
100	1,01	0,97	0,94
101	0,98	0,95	0,92
102	0,96	0,92	0,89
103	0,93	0,90	0,87
104	0,91	0,88	0,85
105	0,89	0,86	0,83
106	0,87	0,84	0,81
107	0,84	0,82	0,79
108	0,82	0,80	0,77
109	0,80	0,78	0,75
110	0,79	0,76	0,73

Table of temperature-resistance values for NTC sensor 50K@25°C ß 3977

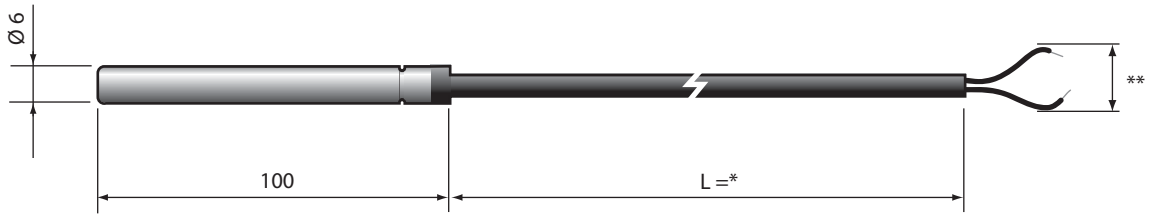
Temperature	Typical resistance	TCR	Min. resistance value	Max. resistance value	% Tolerance		°C Tolerance	
°C	KΩ	%/°C	KΩ	KΩ	Min.	Max.	Min.	Max.
-40	1630.77	-6.623	1559.17	1705.49	-4.39	4.58	0.66	-0.69
-35	1178.11	-6.385	1130.05	1228.08	-4.08	4.24	0.64	-0.66
-30	860.97	-6.161	828.44	894.68	-3.78	3.92	0.61	-0.64
-25	636.08	-5.950	613.91	658.99	-3.49	3.60	0.59	-0.61
-20	474.78	-5.751	459.57	490.44	-3.20	3.30	0.56	-0.57
-15	357.83	-5.562	347.35	368.59	-2.93	3.01	0.53	-0.54
-10	272.18	-5.384	264.93	279.59	-2.66	2.73	0.49	-0.51
-5	208.83	-5.214	203.81	213.96	-2.41	2.45	0.46	-0.47
0	161.56	-5.053	158.08	165.10	-2.15	2.19	0.43	-0.43
5	125.97	-4.900	123.56	128.41	-1.91	1.94	0.39	-0.40
10	98.96	-4.755	97.30	100.63	-1.67	1.69	0.35	-0.36
15	78.29	-4.616	77.16	79.43	-1.44	1.45	0.31	-0.31
20	62.37	-4.483	61.61	63.13	-1.22	1.22	0.27	-0.27
25	50.00	-4.357	49.50	50.50	-1.00	1.00	0.23	-0.23
30	40.34	-4.236	39.85	40.83	-1.21	1.22	0.29	-0.29
35	32.73	-4.120	32.27	33.20	-1.42	1.43	0.34	-0.35
40	26.71	-4.009	26.28	27.15	-1.62	1.64	0.40	-0.41
45	21.92	-3.903	21.52	22.32	-1.81	1.84	0.46	-0.47
50	18.08	-3.801	17.72	18.45	-2.00	2.03	0.53	-0.53
55	14.99	-3.704	14.66	15.32	-2.19	2.22	0.59	-0.60
60	12.48	-3.610	12.19	12.78	-2.36	2.41	0.65	-0.67
65	10.44	-3.519	10.18	10.72	-2.54	2.59	0.72	-0.74
70	8.78	-3.433	8.54	9.02	-2.71	2.77	0.79	-0.81
75	7.41	-3.349	7.20	7.63	-2.87	2.95	0.86	-0.88
80	6.28	-3.269	6.09	6.48	-3.03	3.12	0.93	-0.95
85	5.34	-3.191	5.17	5.52	-3.19	3.28	1.00	-1.03
90	4.56	-3.117	4.41	4.72	-3.34	3.45	1.07	-1.11
95	3.91	-3.045	3.78	4.05	-3.49	3.61	1.15	-1.18
100	3.37	-2.975	3.24	3.49	-3.64	3.76	1.22	-1.26
105	2.91	-2.908	2.80	3.02	-3.78	3.92	1.30	-1.35
110	2.52	-2.843	2.42	2.62	-3.92	4.06	1.38	-1.43
115	2.19	-2.781	2.10	2.28	-4.05	4.21	1.46	-1.51
120	1.91	-2.720	1.83	1.99	-4.18	4.35	1.54	-1.60
125	1.67	-2.662	1.59	1.74	-4.31	4.50	1.62	-1.69
130	1.46	-2.605	1.40	1.53	-4.44	4.63	1.70	-1.78
135	1.28	-2.551	1.22	1.34	-4.56	4.77	1.79	-1.87
140	1.13	-2.498	1.08	1.19	-4.68	4.90	1.87	-1.96
145	1.00	-2.446	0.95	1.05	-4.80	5.03	1.96	-2.06
150	0.89	-2.396	0.84	0.93	-4.91	5.16	2.05	-2.15

6. PT100 PROBE TECHNICAL SPECIFICATIONS

6.1 Models PT100

Probe with fastening clamp

Storage conditions	-20T70 °C
Sensitive element operating range	PT100000A1: -50 °C to +250 °C PT100000A2 : -50 °C to +400 °C
Sensor	Pt100 Class B in accordance with DIN IEC751, 3 wire
Precision	+/- class B=(0.005xt)+0.3, a 100 °C = ±0.8 °C
Power and output connections	Stripped ends, dimensions 6±1mm
Cable	PT100000A1: silicone rubber HALOGEN COMPOUNDS ≤ 1.1 x 10-3 mg/g PT100000A2: 3x0.5 mm^2 fibreglass wire and secondary insulation
Dissipation factor (in air)	0.3 K/mW at 0 °C
Thermal constant over time (in air)	R0-drift 0.004 % after 1000h at 500 °C
Category of resistance to heat and fire	Range -20 °C +200 °C for PT100000A1, +500 °C for PT100000A2
Insulation resistance	>500 Mohm / 250 V
Dielectric strength	250 Vac (code PT100000A1 only) not applicabie for PT100000A2
Primary insulation (porbe and cable)	250 Vac
Sensitive element index of protection	IP65
Sensitive element housing	AISI 316 stainless steel



* = see table of product codes in price list
**= the sensor may have 2 or 3 wires

7. TABLE OF TEMPERATURE VALUES PT100 PROBE

7.1 Table of temperature values PT100 Probe Class B

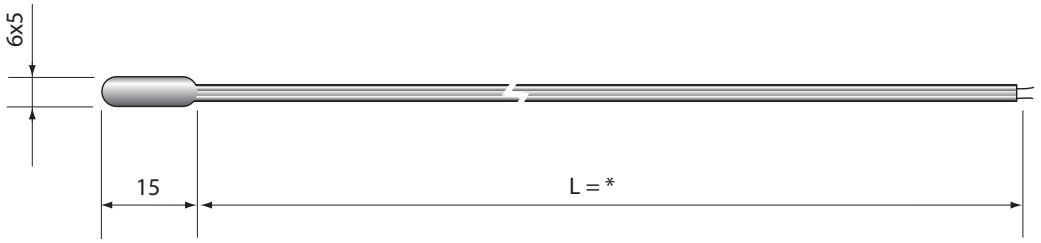
R (0) = 100,00 Ω α = 0,003 850 1/°C

°C	0	1	2	3	4	5	6	7	8	9	10	°C
- 200	IB,49											- 200
-190	22,80	22,37	21,94	21,51	21,08	20,65	20,22	19,79	19,36	18,93	18,49	-190
- I80	27,08	26,65	26,23	25,80	25,37	24,94	24,52	24,09	23,66	23,23	22,80	- I80
- 170	31,32	30,90	30,47	30,05	29,63	29,20	28,78	28,35	27,93	27,50	27,08	- 170
-160	35,53	35,11	34,69	34,27	33,85	33,43	33,01	32,59	32,16	31,74	31,32	-160
-150	39,71	39,30	38,88	38,46	38,04	37,63	37,21	36,79	36,37	35,95	35,53	-150
-140	43,87	43,45	43,04	42,63	42,21	41,79	41,38	40,96	40,55	40,13	39,71	-140
-130	48,00	47,59	47,18	46,76	46,35	45,94	45,52	45,11	44,70	44,28	43,87	-130
-120	52,11	51,70	51,29	50,88	50,47	50,06	49,64	49,23	48,82	48,41	48,00	-120
-110	56,19	55,78	55,38	54,97	54,56	54,15	53,74	53,33	52,92	52,52	52,11	-110
-100	60,25	59,85	59,44	59,04	58,63	58,22	57,82	57,41	57,00	56,60	56,19	-100
-90	64,30	63,90	63,49	63,09	62,68	62,28	61,87	61,47	61,06	60,66	60,25	-90
-80	68,33	37,92	67,52	67,12	66,72	66,31	65,91	65,51	65,11	64,70	64,30	-80
-70	72,33	71,93	71,53	71,13	70,73	70,33	69,93	69,53	69,13	68,73	68,33	-70
-60	76,33	75,93	75,53	75,13	74,73	74,33	73,93	73,53	73,13	72,73	72,33	-60
-50	80,31	79,91	79,51	79,11	78,72	78,32	77,92	77,52	77,13	76,73	76,33	-50
-40	84,27	83,88	83,48	83,08	82,69	82,29	81,89	51,50	81,10	80,70	80,31	-40
-30	88,22	87,83	87,43	87,04	86,64	86,25	85,85	85,46	85,06	84,67	84,27	-30
-20	92,16	91,77	91,37	90,98	90,59	90,19	89,80	89,40	89,01	88,62	88,22	-20
-10	96,09	95,69	95,30	94,91	94,52	94,12	93,73	93,34	92,95	92,55	92,16	-10
0	100,00	99,61	99,22	98,83	98,44	98,04	97,65	97,26	96,87	96,48	96,09	0
0	100,00	100,390	100,78	101,17	101,56	101,95	102,34	102,73	103,12	103,51	103,90	0
10	103,90	104,29	104,68	105,07	105,46	105,85	106,24	106,63	107,02	107,40	107,79	10
20	107,79	108,18	108,57	108,96	109,35	109,73	110,12	110,51	110,90	111,28	111,67	20
30	111,67	112,06	112,45	112,83	113,22	113,61	113,99	114,38	114,77	115,15	115,54	30
40	115,54	115,93	116,31	116,70	117,08	117,47	117,85	118,24	118,62	119,01	119,40	40
50	119,40	119,78	120,16	120,55	120,93	121,32	121,70	122,09	122,47	122,86	123,24	50
60	123,24	123,62	124,01	124,39	124,77	125,16	125,54	125,92	123,31	126,69	127,07	60
70	127,07	127,45	127,84	128,22	128,60	128,98	129,37	129,75	130,13	130,51	130,89	70
80	130,89	131,27	131,66	132,04	132,42	132,80	133,18	133,56	133,94	134,32	134,70	80
90	134,70	135,08	135,46	135,84	136,22	136,60	136,98	137,36	137,74	138,12	138,50	90
100	138,50	138,88	139,26	139,64	140,02	140,39	140,77	141,15	141,53	141,91	142,29	100
110	142,29	142,66	143,04	143,42	143,80	144,17	144,55	144,93	145,31	145,68	146,06	110
120	146,06	146,44	146,81	147,19	147,57	147,94	148,32	148,70	149,07	149,45	149,82	120
130	149,82	150,20	150,57	150,95	151,33	151,70	152,08	152,45	152,83	153,20	153,58	130
140	153,58	153,95	154,32	154,70	155,07	155,45	155,82	156,19	156,57	156,94	157,31	140
150	157,31	157,69	158,06	158,43	158,81	159,18	159,55	159,93	160,30	160,67	161,04	150
160	161,04	161,42	161,79	162,16	162,53	162,90	163,27	163,65	164,02	164,39	164,76	160
170	164,76	165,13	165,50	165,87	166,24	166,61	166,98	167,35	167,72	168,09	168,46	170
180	168,46	168,83	169,20	169,57	169,94	170,31	170,68	171,05	171,42	171,79	172,16	180
190	172,16	172,53	172,90	173,26	173,63	174,00	174,37	174,74	175,10	175,47	175,84	190
200	175,84	176,21	176,57	176,94	177,31	177,68	178,04	178,41	178,78	179,14	179,51	200
210	179,51	179,88	180,24	180,61	180,97	181,34	181,71	182,07	182,44	182,80	183,17	210
220	183,17	183,53	183,90	184,26	184,63	184,99	185,36	185,72	186,09	186,45	186,82	220
230	186,82	187,18	187,54	187,91	188,27	188,63	189,00	189,36	189,72	190,09	190,45	230
240	190,45	190,81	191,18	191,54	191,90	192,26	192,63	192,99	193,35	193,71	194,07	240
250	194,07	194,44	194,80	195,16	195,52	195,88	196,24	196,60	196,96	197,33	197,69	250
260	197,69	198,05	198,41	198,77	199,13	199,49	199,85	200,21	200,57	200,93	201,29	260
270	201,29	201,65	202,01	202,36	202,72	203,08	203,44	203,80	204,16	204,52	204,88	270
280	204,88	205,23	205,59	205,95	206,31	206,67	207,02	207,38	207,74	208,10	208,45	280
290	208,45	208,81	209,17	209,52	209,88	210,24	210,59	210,95	211,31	211,66	212,02	290
300	212,02	212,37	212,73	213,09	213,44	213,80	214,15	214,51	214,86	215,22	215,57	300
310	215,57	215,93	216,28	216,64	216,99	217,35	217,70	218,05	218,41	218,76	219,12	310
320	219,12	219,47	219,82	220,18	220,53	220,88	221,24	221,59	221,94	222,29	222,65	320

8. PT1000 PROBE TECHNICAL SPECIFICATIONS

8.1 Models PT1*HP*

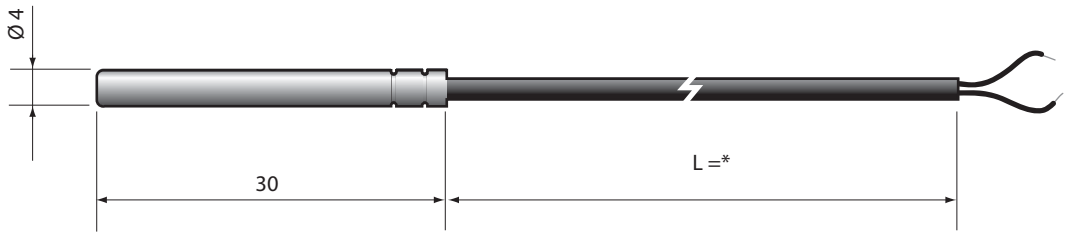
Storage conditions	-20T70 °C
Operating range	-50T105 °C in air
	-50T50 °C in fluid
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	Pt1000 - Class B
Dissipation factor (in air)	approx. 3 mW/°C
Thermal constant over time (in air)	ca. / approx. 75 s
Cable	Black two-wire flat cable, with tinned copper wire size 0.3 mm^2
Sensitive element index of protection	IP67
Sensitive element housing	Polyolefin
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant



* = see table of product codes in price list

8.2 Models PT1*WF*

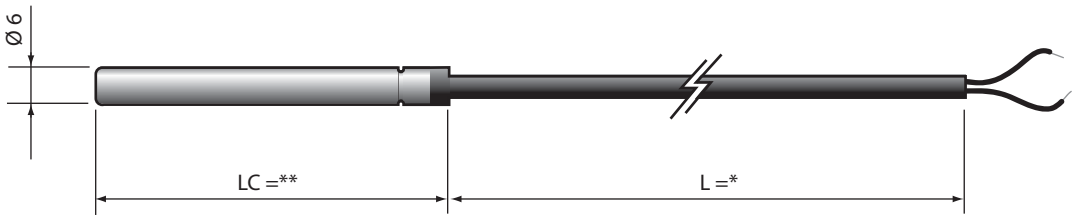
Storage conditions	-20T70 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	Pt1000 - Class B
Dissipation factor (in air)	approx. 7 mW/°C
Thermal constant over time (in water)	approx. 4.5 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max.
Sensitive element index of protection	IP67
Sensitive element housing	AISI 316 steel diameter 4 mm - L= 30 mm
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac;
Category of resistance to heat and fire	Flame retardant



* = see table of product codes in price list

8.3 Models PT1*WP*

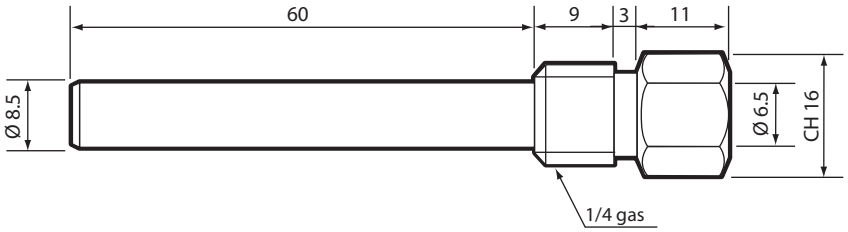
Storage conditions	-20T70 °C
Operating range	-50T105 °C
Connections	Stripped ends, dimensions: 5±1 mm
Sensor	Pt1000 - Class B
Dissipation factor (in air)	approx. 2.2 mW/°C
Thermal constant over time (in water)	approx. 10 s
Cable	Two-wire with double sheath, AWG22, tinned copper with electrical resistance ≤63 Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/Co inside on wires, OD 3.5 mm max
Sensitive element index of protection	IP68 Immersion in water 1 m depth for 200 h at 70 °C Resistance in autoclave to saturated steam 30 min. at 105 °C
Sensitive element housing	PP/Co with AISI 316 outer cap
Classification according to protection against electric shock (sensitive element & cable)	Supplementary insulation for 250 Vac;
Category of resistance to heat and fire	Flame retardant



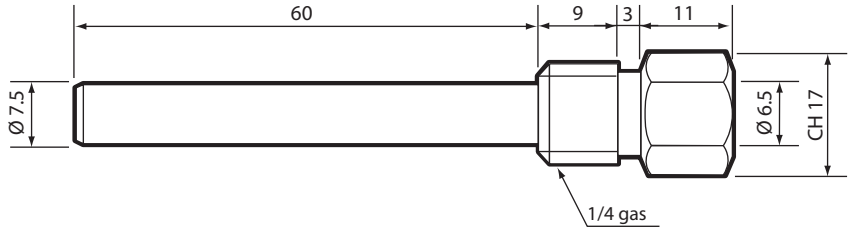
* = see table of product codes in price list

Accessories

Socket: nickel-coated brass - 1413306AXX



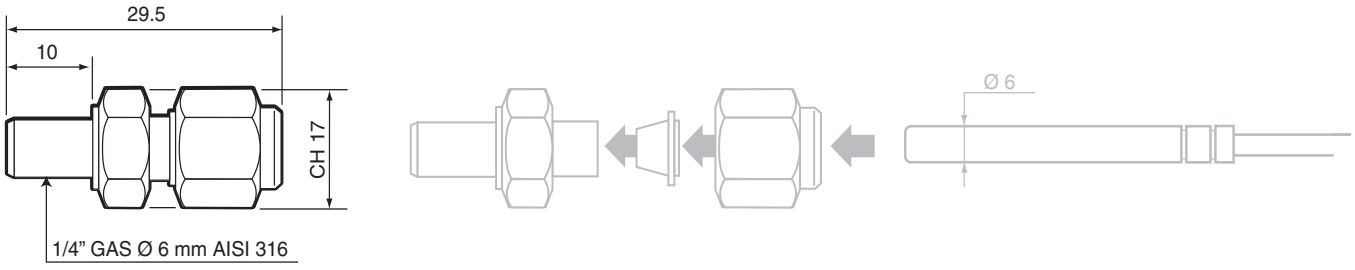
Socket 2: AISI 316 - code 1413309AXX



Note:

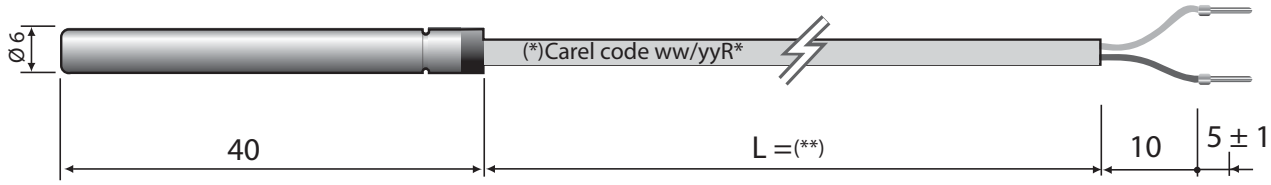
- cable secured with PG7 - IP68 cable gland applied to hexagonal end
- kit available complete with socket and cable gland

Compression fitting with metal olive - code 1309589AXX



8.4 PT1*HT* Models

Storage conditions	-20T70 °C
Operating range	-50T250 °C
Connections	with crimped metal terminals
Sensor	Pt1000 - Class B (2 wires)
Dissipation factor (in air)	ca. / approx. 7 mW/°C
Thermal constant over time (in water)	ca. / approx.20 s (V=2m/s)
Cable	White Teflon with two cables red and white Section. 2x0.22 mm² Ø3 mm
Sensitive element index of protection	IP67
Sensitive element housing	Silicone resin
Cap material	Stainless steel Aisi 304
Dimension cap	6x40 mm
Classification according to protection against electric shock (sensitive element & cable)	additional insulation
Category of resistance to heat and fire	Flame retardant
Isolation resistance	20 Mohm 500 Vcc
Dielectric rigidity	2000Vac

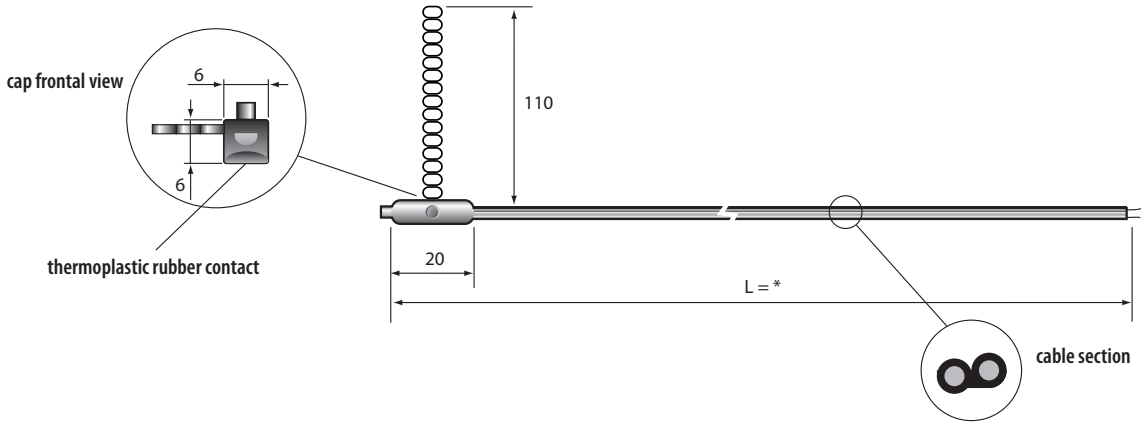


Notes:
(*) ww/yyR*:
ww = week of production;
yy = year of production;
R* = Revision.
(**) see table of product codes in price list

8.5 Models PT1*HF

Probe with fastening clamp

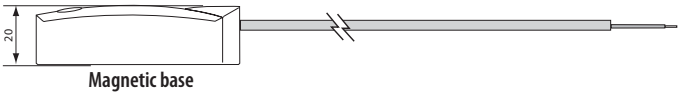
Storage conditions	-20T70 °C
Sensitive element operating range	-50T105 °C
Connections	Stripped ends, dimensions 6±1mm
Sensor	Pt1000 Class B
Precision	+/- 0.8 °C; -50T90 °C
Dissipation factor (in air)	3 mW
Thermal constant over time (in air)	approx. 15 s
Cable	Black thermoplastic rubber flat cable (diam. 3.6x1.6 max.)
Sensitive element index of protection	IP67
Sensitive element housing	Thermoplastic with fastening clamp
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Category of resistance to heat and fire	UL/HB cable
Insulation resistance at 1000 Vdc	>20 Mohm
Dielectric strength	1500 Vac



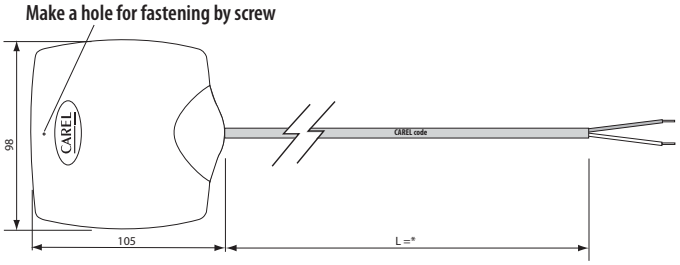
* = see table of product codes in price list

8.6 Models PT1*PS*

Storage conditions	-20T70 °C
Operating range	-50T105 °C
Connections	Stripped and soldered ends, dimensions: 4±1 mm
Sensor	Pt1000 Class B
Dissipation factor (in air)	2 mW/°C
Thermal constant over time (in air)	approx. 50 min (V=1 m/s)
Cable	Two-wire with double sheath, AWG22, tinned copper with resistance ≤73.9Ω/km - Insulation: TPE specific for immersion in water on outer sheath, PP/co inside on wires, OD 3.30+/-0.10 mm
Sensitive element index of protection	IP67
Case	RAL7032 grey Santoprene Food safe
Classification according to protection against electric shock (sensitive element & cable)	Supplementary insulation for 250 Vac
Category of resistance to heat and fire	Flame retardant



Magnetic base



* = see table of product codes in price list

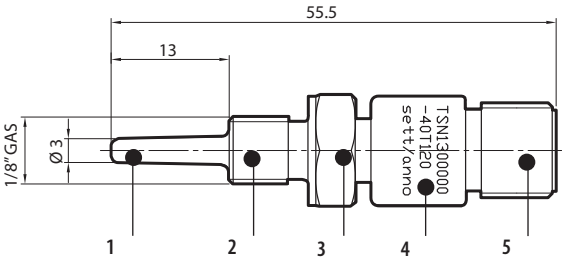
9. PT1000 IMMERSION PROBE TECHNICAL SPECIFICATIONS

9.1 Model TST1300000

Immersion probes feature the sensor directly in contact with the liquid, and are installed on the tubing. Wired using the electrical connector.

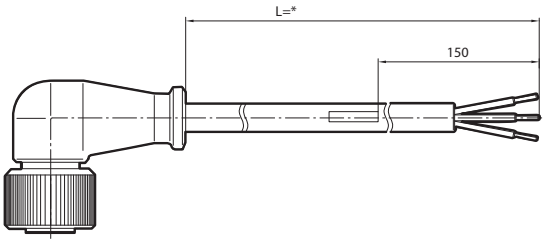
Storage conditions	-20T70 °C
Operating range	-40T120 °C
Sensor	Pt1000 Class B
Construction	Direct immersion with connection to the 1/8" GAS male process fitting as per UNI 338
Electrical connection	4-pin co-moulded nylon, M12x1 (DIN-VDE0627) metric thread, IP67 max. temp. 90°C
Thermal constant over time (in water)	approx. 5 s
Sensitive element housing	AISI 316
Insulation	100 Mohm a 500 Vdc
Maximum operating pressure	40 bar

1	sensitive element NTC 10 Kohm
2	stainless steel socket
3	EX14
4	co-moulded body
5	M12 male connector

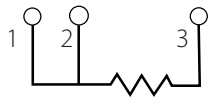


Accessories:

- 4-pin M12 connector for 1/8 GAS sensor - cable length 3 m
  Code TSOPZCW030



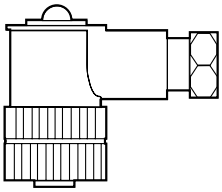
Wiring:

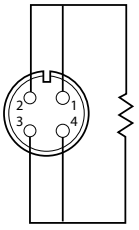


PT1000

1	red
2	red
3	white

- 4-pin M12 connector for 1/8 GAS sensor
  Code TSOPZCM000
  M12 connector can be assembled on site, recommended cable 3x0.2 mm^2 with outer sheath.

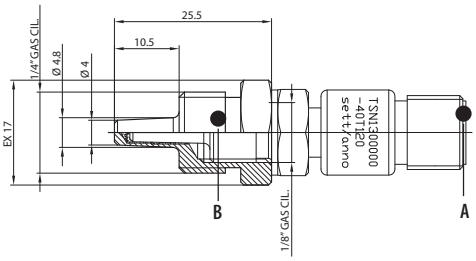


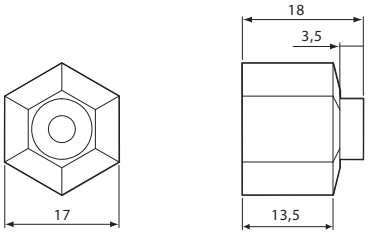


Note: the three-wire connection for the Pt100 must be used when the controller is fitted accordingly. If not, the ends are to be connected together on the same terminal.

Sensor connector side view

A	Compact thermistor with 1/8" GAS cyl. fitting
B	1/4" GAS cyl. process fitting with immersion L= 10.5 mm

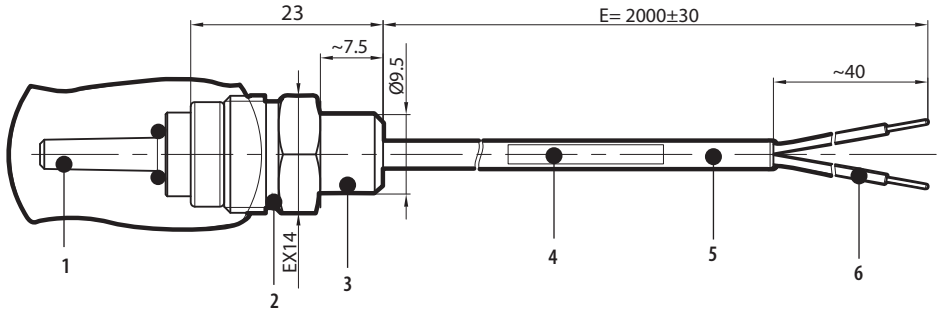




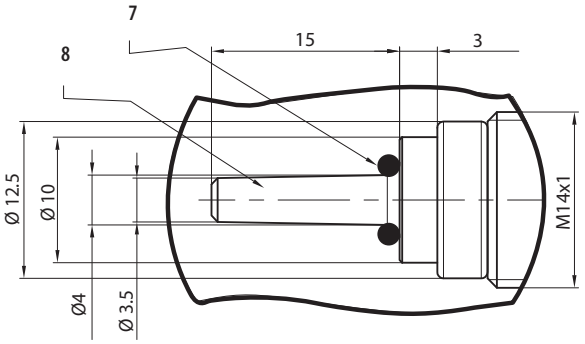
9.2 Model TSM1500B30

Immersion probes feature the sensor directly in contact with the liquid and are secured to the tubing using a connector, available in the screw or weldable versions.
The body is nickel-coated brass, index of protection IP67, and the gasket (O-ring) is supplied together with the probe.

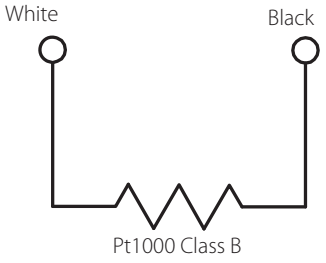
Storage conditions	-20T70 °C
Operating range	-40T90 °C
Sensor	Pt1000 Class B
Construction	Direct immersion with connection to M14 male process fitting
Cable	2 wires AWG 22, with TPE sheath
Thermal constant over time (in water)	approx. 5 s
Sensitive element housing	Nickel-coated brass & PA6 gray co-moulded body
Insulation	100 Mohm at 100 Vdc
Maximum operating pressure	25 bar
Compatible liquids	Water, Oil



1	sensitive element
2	nickel-coated brass locking ring
3	co-moulded body
4	cable marking
5	tinned copper 2-wire cable
6	NTC sensor
7	2015 O-ring
8	nickel-coated brass thermometer socket

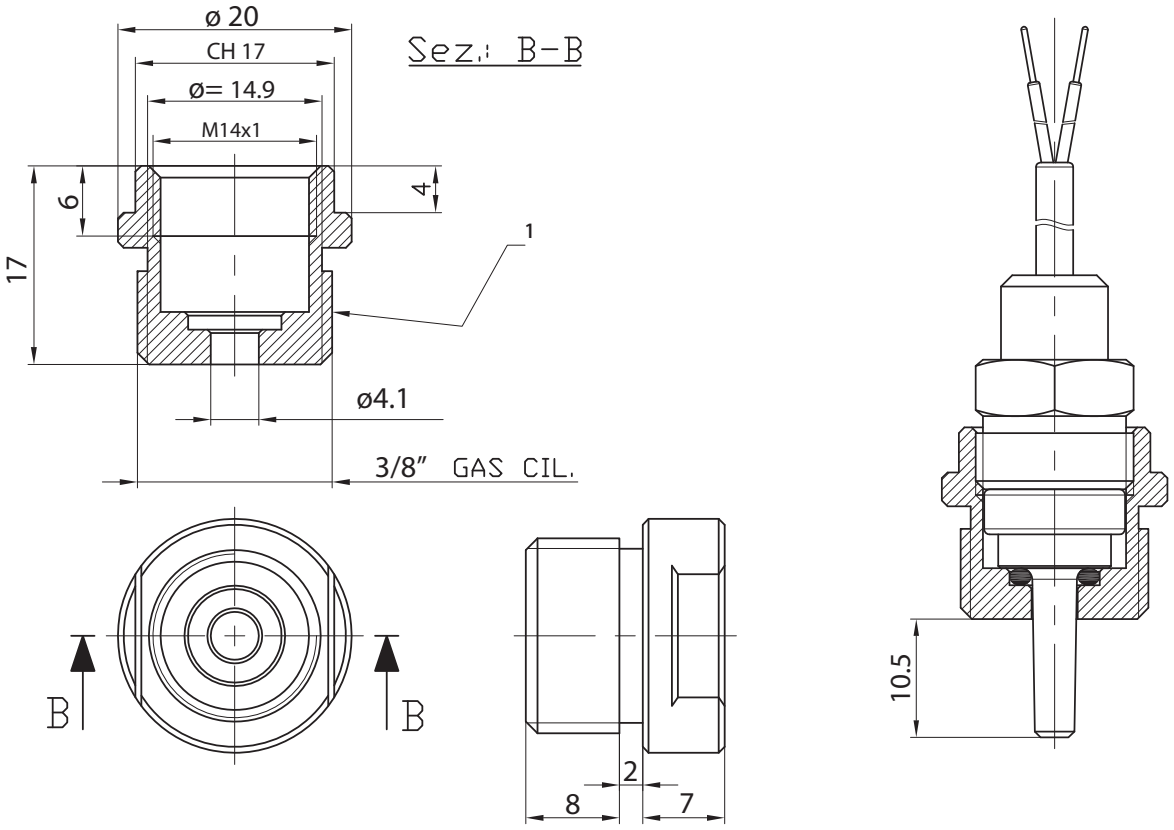


Wiring

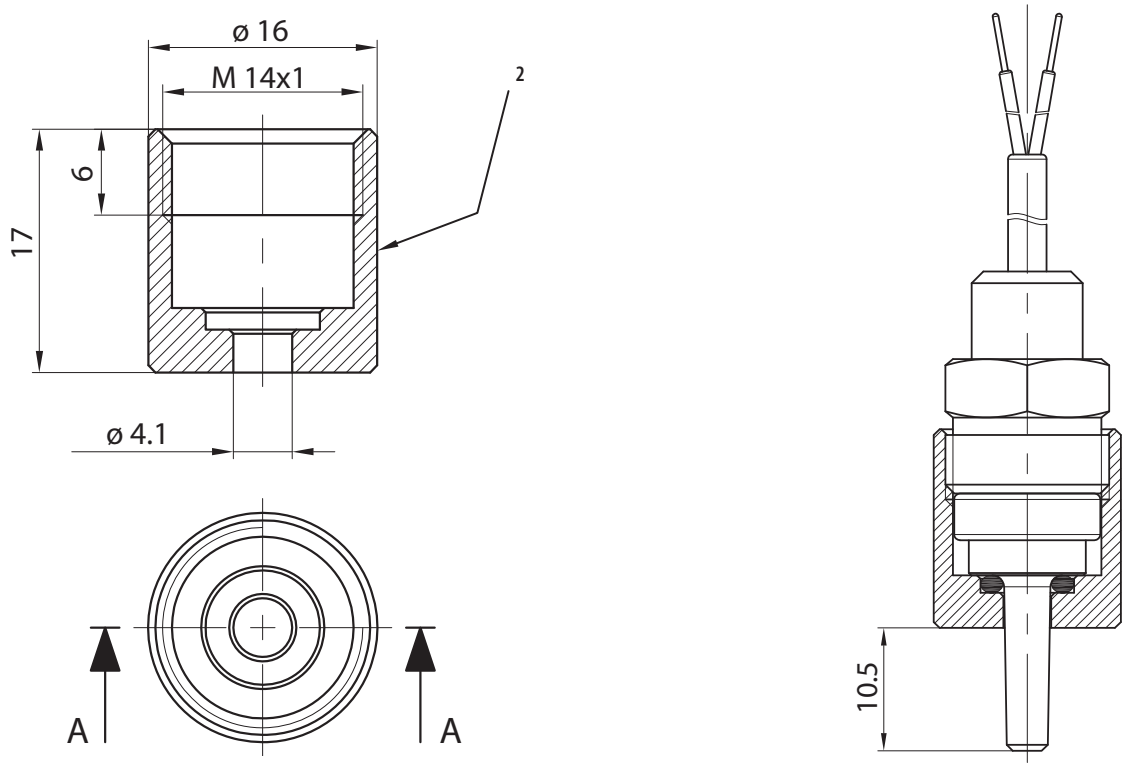


Accessories:

Adapter from M14 to 3/8 GAS
Code TSOPZRV000



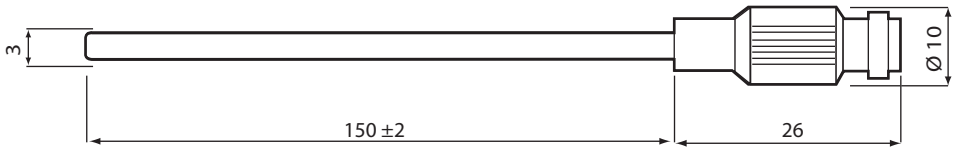
Weldable adapter for M14
Code TSOPZRS000



1	3/8 cyl. threaded fitting with round seat, nickel-coated brass	code: C058042A04
2	weldable cylindrical fitting with round seat, brass	code C058042A03

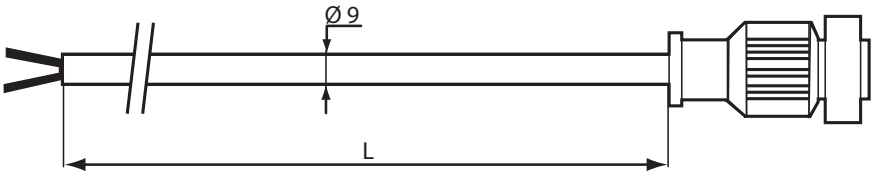
9.3 Models TSQ15MAB00

Storage conditions	-20T70 °C
Sensitive element operating range	-50T350 °C
Connections	3-pin DIN connector
Sensor	Pt1000 Class B
Thermal constant over time (in water)	approx. 2.5 s
Cable code TSOPZCV030 & code TSOPZCV100 & extension cable code TSOPZCV070	silicone cable L= 3 m, 10 m (max. temp. = 180 °C) with 3-pin DIN connector (max. conn. temp.= 90 °C) as per DIN-VDE0627 with M8x1 screw coupling.
Optional compression fitting TSOPZFGD30	AISI 316, 1/4 gas (see paragraph 4.4)
Index of protection connessione	IP65
Sensitive element housing	AISI 316 steel
Insulation resistance	Insulation at 100 Vdc > 100 mOhm
Category of resistance to heat and fire	flame retardant

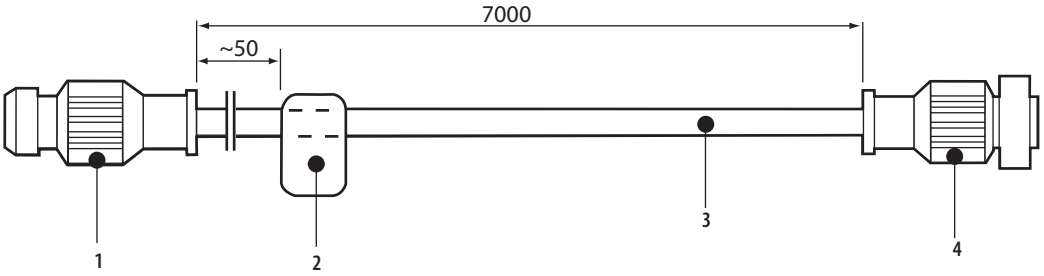


Accessories:

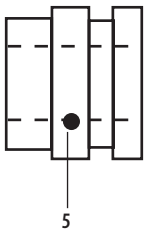
A



B



C



Key	
1	M8 connector
2	rating label
3	24 AWG 2 wire cable insulated with silicone rubber
4	M8 co-moulded connector
5	1/4" compression fitting - D= 3 mm, AISI316 steel

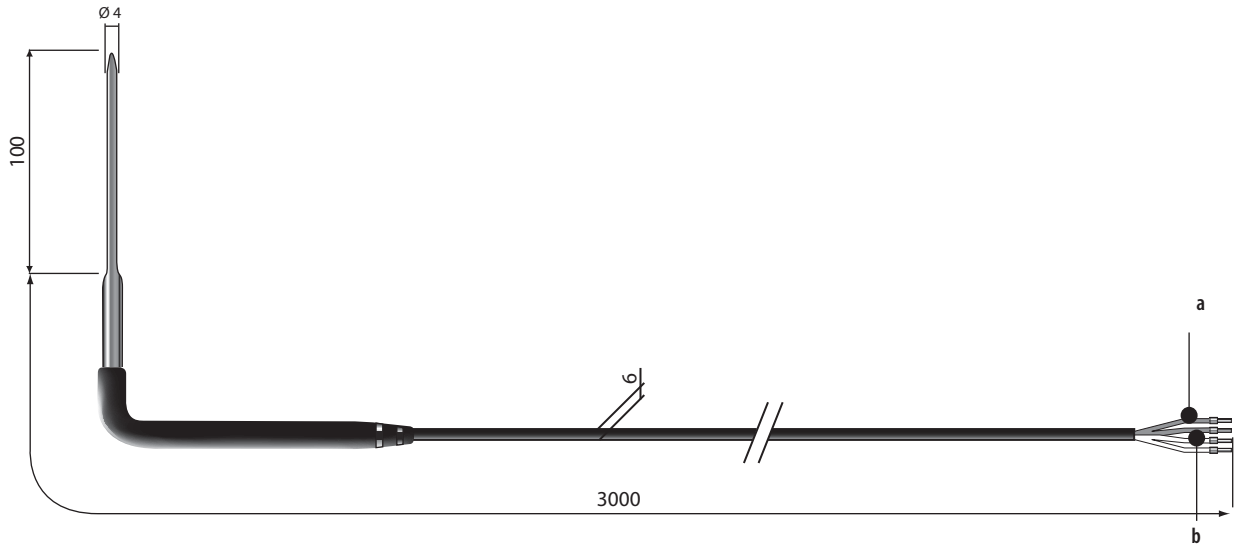
A	TSOPZCV030:	silicone cable with M8 connector, length 3 m
	TSOPZCV100:	silicone cable with M8 connector, length 10 m
B	TSOPZCV070:	silicone extension cable with M8 male/female connector, length 7 m
C	TSOPZFGD30:	compression fitting suitable for 3 mm

10. PT1000 PIERCING PROBE TECHNICAL SPECIFICATIONS

10.1 Model PT1INF0340

Piercing probe with "L" handle and heating system.

Storage conditions	-20T70 °C
Operating range	-50T200 °C
Connections	Stripped ends, with terminals
Sensor	Pt1000 Class B
Thermal constant over time (in water)	approx. 10 s
Cable	Food-safe thermoplastic sheath with 4 wires size 0.15 mm^2
Wire colours	White-black, PT1000 / red, electric heater.
Maximum heater voltage	24 Vac
Electrical resistance of heater	7 Ohm ±0.6
Cable length	3 m
Sensitive element index of protection	IP67
Sensitive element housing	AISI 316 stainless steel. Length 100 mm diam. 4 mm. With pointed tip
Cap filler	Aluminium
Classification according to protection against electric shock (sensitive element & cable)	Insulation: Outer sheath, and inside on wires
Category of resistance to heat and fire	Flame retardant
Insulation resistance	20 Mohm 500 Vdc
Dielectric strength	500 Vac



a	red, electric heater
b	white/black, NTC

11. PTC TECHNICAL SPECIFICATIONS

11.1 Models PTC0150000 – PTC0600000

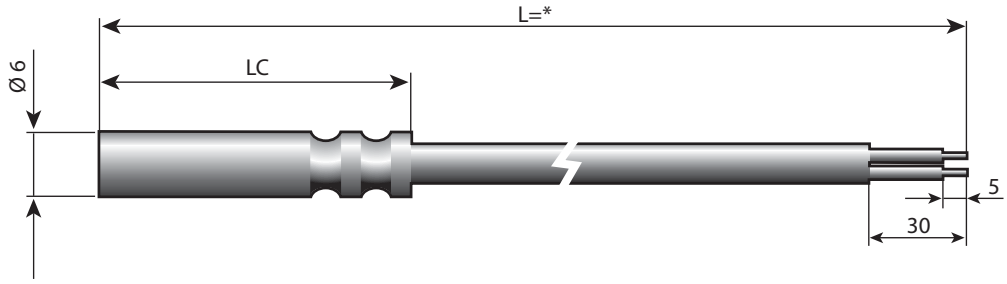
Storage conditions	-20T70 °C
Operating range	0T150 °C
Connections	Stripped ends, dimensions 6±1mm
Sensor	SEN.KTY81/121-20/5
Precision	± 2 °C; 0T50 °C;
	± 3 °C; -50T90 °C;
	± 4 °C; 90T120 °C.
Dissipation factor (in air)	3 mW
Thermal constant over time (in air)	approx. 60 s (10 s in water)
Cable	Silicone
Sensitive element index of protection	IP65
Sensitive element housing	Dim. 40x6 mm
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Insulation resistance at 500 Vdc	>20 mOhm
Dielectric strength	2000 Vac

11.2 Models PTC015W000 - PTC060W000 - PTC060WA00

Storage conditions	-20T70 °C
Operating range	-50T100 °C
Connections	Stripped ends, dimensions 6±1mm
Sensor	SEN.KTY81/121-20/5
Precision	± 2 °C; 0T50 °C; ± 3 °C; -50T90 °C; ± 4 °C; 90T120 °C.
Dissipation factor (in air)	3 mW
Thermal constant over time (in air)	approx. 60 s (10 s in water)
Cable	Silicone
Sensitive element index of protection	IP67
Sensitive element housing	Dim. 40x6 mm - 180x6 mm (PTC060WA00)
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac
Insulation resistance at 500 Vdc	>20 mOhm
Dielectric strength	2000 Vac

11.3 Models PTC03000W1 - PTC03003000D1 - PTC03000G1

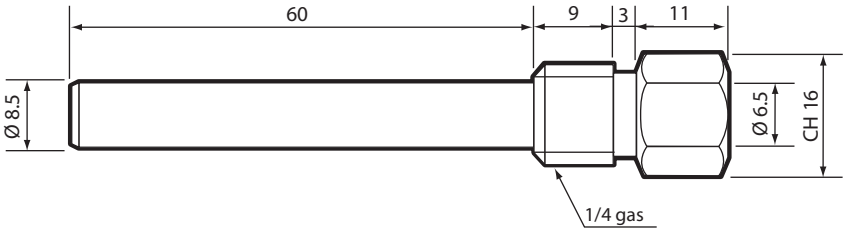
Storage conditions	-20T70 °C	
Operating range	PTC03000W1	Range -30*105 °C
	PTC03000D1	Range -30*105 °C
	PTC03000G1	Range -50*120 °C
Connections	Stripped ends, dimensions 6±1mm	
Sensor	SEN.KTY81/121-20/5	
Precision	± 2 °C; 0T50 °C; ± 3 °C; -50T90 °C; ± 4 °C; 90T120 °C.	
Dissipation factor (in air)	3 m	
Thermal constant over time (in air)	approx. 60 s (10 s in water)	
Cable	Black PVC (PTC03000D1) Grey silicone (PTC03000G1) White PVC (PTC03000W1)	
Sensitive element index of protection	IP67	
Sensitive element housing	Dim. 40x6 mm	
Classification according to protection against electric shock (sensitive element & cable)	Basic insulation for 250 Vac	
Insulation resistance at 500 Vdc	>20 mOhm	
Dielectric strength	2000 Vac	



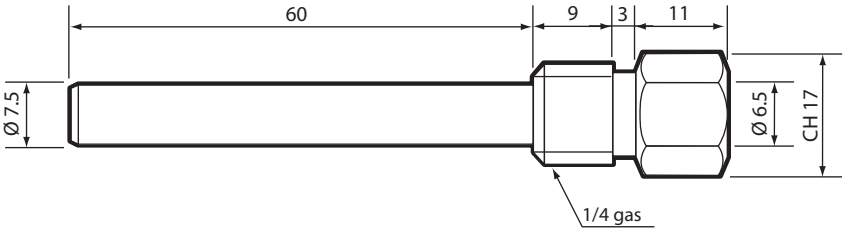
* = see table of product codes in price list

Accessories

Socket: nickel-coated brass - 1413306AXX



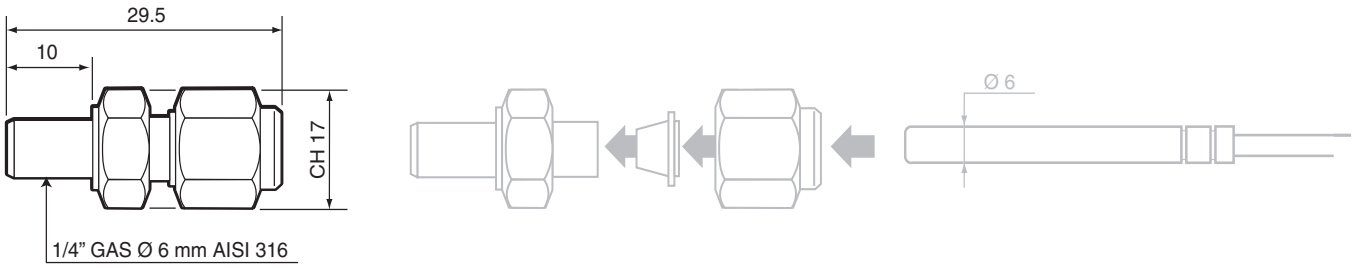
Socket 2: AISI 316 - code 1413309AXX



Note:

- cable secured with PG7 - IP68 cable gland applied to hexagonal end
- kit available complete with socket and cable gland

Compression fitting with metal olive - code 1309589AXX



12. LIGHT SENSOR TECHNICAL SPECIFICATIONS

12.1 Model PSOPZLHT00

Storage conditions	-20T70 °C
Sensitive element operating range	-20T70 °C
Sensor	Perkin Elmer optoelectronics A906011 sensor
Capsule material	Transparent polypropylene with epoxy resin
Cable	Black PVC diam 4.6 mm
Power and output connections	Stripped ends, dimensions 6±1mm
Insulation resistance	20 Mohm 500 V
Dielectric strength	2000 Vac
Sensitive element housing	Transparent polypropylene
Sensitive element housing	Dim. 7x26 mm

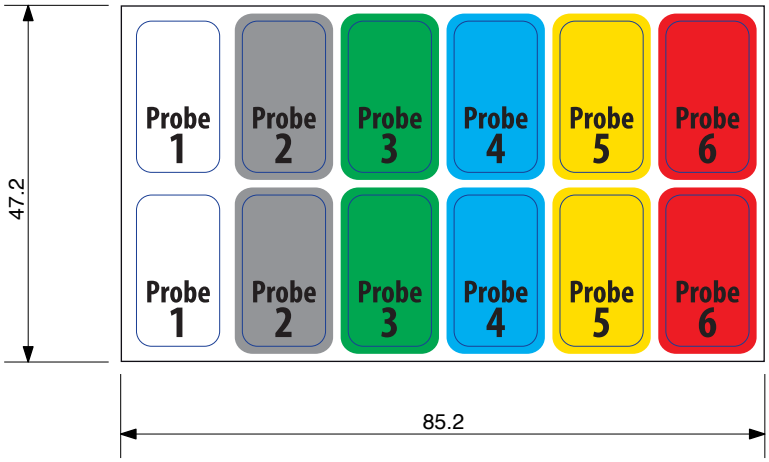
12.2 Sensitive element specifications

Type	R_{10}	R_{100}	R_{01}	R_{05}	V_{max}	P_{max}	$\gamma_{10/100}$	λ_{peak}
unit	KΩ	KΩ typ.	M Ωmin	MΩ min	V	mW	typ	nm
A 9060 11	9...20	3,5	0,06	0,18	150	90	0,65	600

13. ACCESSORIES

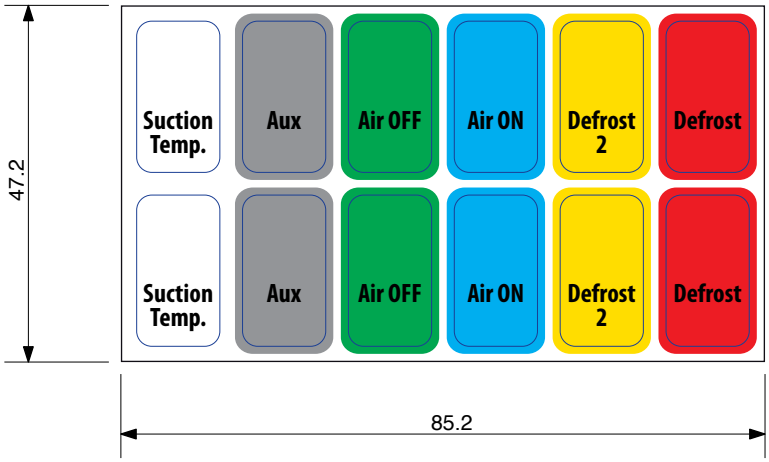
Coloured labels to be applied to the end of the sensors and simplify connection to the controller for installers

For refrigeration applicationsi



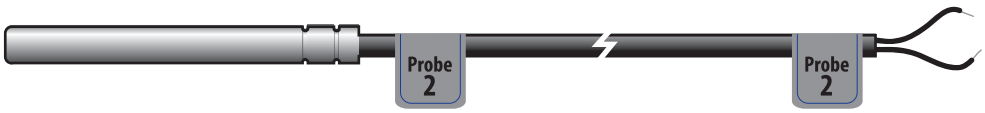
Cod. 62C588A005

For general applications



Cod. 62C588A006

Example



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